

## McDonough & Rea Associates, Inc.

*Traffic and Transportation Consulting*

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Kevin P. McDonough (1953-1994)  
John H. Rea, P.E.  
Jay S. Troutman, Jr., P.E.  
Scott T. Kennel

July 27, 2020

Howell Township Zoning Board of Adjustment  
4567 Route 9 North  
P.O. Box 580  
Howell, NJ 08730

Re: Flex Space-Preliminary & Final Site Plan  
Lot 17.02 in Block 219  
Howell Township, Monmouth County  
MRA File No. 20-160

Dear Board Members:

McDonough & Rea Associates (MRA) has been asked to provide the Zoning Board of Adjustment with a *Traffic Impact Analysis* for plans to construct 3 flex space (office and warehouse) buildings on the noted property. The subject property is located on the east side of Squankum-Yellowbrook Road (CR 524A) as shown on *Figure 1 a Site Location Map* in the *Appendix*.

Plans prepared by WJH Engineering (WJH) show a single point of access to CR 524A which is under the jurisdiction of Monmouth County. Three *flex space* buildings containing office and warehouse space are proposed along with 111 parking spaces.

### **SCOPE OF STUDY**

In order to prepare a thorough *Traffic Impact Analysis* for the proposed flex space buildings, MRA conducted the following tasks:

1. Made field visits to the site to establish existing roadway and traffic conditions in the area.
2. Obtained peak hour traffic volume data for traffic volumes passing the site from historical data collected by MRA at the CR 524A/CR524 intersection.
3. Prepared estimates of traffic to be generated by the flex space based upon Institute of Transportation Engineers (ITE) data.

Please reply to:

- 1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673  
 105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181



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Howell Township Zoning Bd. of Adj.

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July 27, 2020

4. Distributed site generated traffic north and south along CR 524A in accordance with anticipated origins and destinations of site generated traffic.
5. Prepared estimates of future traffic volume demand for the design year of the project (2025), including background traffic growth from historical New Jersey Department of Transportation (NJDOT) data and traffic to be generated by other projects in the area either approved or under construction.
6. Conducted level of service capacity analyses for the site driveway, based upon *Highway Capacity Manual* procedures.
7. Reviewed the *Site Plan* with respect to availability and accessibility of the parking supply and conformance to proper traffic engineering principles.

The following report sets forth the database accumulated and the conclusions reached with respect to the flex space buildings.

**EXISTING CONDITIONS**

Squankum-Yellowbrook Road (CR 524A) is an urban major collector roadway providing for 2 travel lanes, 1 in each direction. It has a general east/west orientation and a posted speed limit of 45 MPH in the vicinity of the site.

Surrounding land use consists of the *Howell Township Middle School* and *Howell Township High School* on the opposite side of CR 524A, *Crosspoint Church* and several industrial buildings on the same side of CR 524A.

**EXISTING TRAFFIC VOLUMES**

Traffic volume data was obtained by reviewing historical counts conducted by MRA in 2019 at the CR 524A/CR 524 intersection during AM and PM peak street hours. The counts were conducted when schools in the area (Howell middle School, Howell High School) were open and generating traffic. The counts were revised upward to reflect 2020 conditions. Existing traffic flow passing the site during the AM and PM peak street hour are shown on *Figure 2* in the *Appendix*.



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**TRIP GENERATION/DISTRIBUTION**

Estimates of traffic to be generated by the flex space were made after consulting the 10<sup>th</sup> Edition of the ITE Trip Generation Manual. A separate calculation was conducted for the amount of office space (13,072 SF) and warehouse space (57,650 SF) that are proposed. Table I illustrates the anticipated AM and PM peak hour traffic volumes generated by the site.

**TABLE I  
TRIP GENERATION  
FLEX SPACE BUILDINGS**

<u>USE</u>	<u>AM PSH</u>			<u>PM PSH</u>		
	<u>IN</u>	<u>OUT</u>	<u>TOTAL</u>	<u>IN</u>	<u>OUT</u>	<u>TOTAL</u>
13,072 SF Office Space	34	5	39	3	14	17
57,650 SF Warehouse Space	<u>25</u>	<u>7</u>	<u>32</u>	<u>9</u>	<u>26</u>	<u>35</u>
<b>Total</b>	<b>59</b>	<b>12</b>	<b>71</b>	<b>12</b>	<b>40</b>	<b>52</b>

With respect to the distribution of site generated traffic, a review was made of higher order roadways in the area such as CR 524 and Interstate 195, as well as a review of existing traffic volumes and population density surrounding the site. As a result, traffic was distributed 50 percent to and from the north and 50 percent to and from the south and is shown on Figure 3 in the Appendix entitled Site Generated Traffic Volumes.

**ANALYSIS OF FUTURE TRAFFIC**

A design year of 2025 was assumed for analysis. Existing 2020 traffic volumes were expanded to 2025 after reviewing the NJDOT's Historical Growth Rate data for the area and reviewing traffic that will be generated by the Stone Quest warehouse building which was not occupied at the time of the existing traffic counts. Figure 4 in the Appendix illustrates design year 2025 no-build traffic volumes. Site generated and distributed traffic volumes were then surcharged onto no-build volumes and are shown on Figure 5 in the Appendix.

Traffic engineers calculate levels of service of unsignalized intersections which relate to the quality of traffic flow. Level of service is a measure of average control delay. Average control delay is the time lost due to deceleration and the amount of time from when a vehicle is stopped for a traffic control device (or at the end of the queue) to when the vehicle departs the intersection. Delay is a relative quantity of driver discomfort, frustration, fuel consumption, and loss in travel time.



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July 27, 2020

Levels of service range from “A” to “F” with “A” being the highest or best attainable level of service. Level of service “E” with average control delays of not more than 50 seconds per vehicle at an unsignalized intersection indicates near to or at capacity conditions and is generally considered the limit of acceptable level of service and delay.

Full definitions of levels of service for unsignalized intersections as well as level of service summaries are included in the *Appendix*. The intersections studied by this report were analyzed according to the procedures set forth in the *Highway Capacity Manual 2010*, using the *McTrans Highway Capacity Software (HCS)*, release 7.5.

Findings were that exiting movements at the site driveway to CR 524A will do so at level of service “B” during both the AM and PM peak street hours. Left turns into the site driveway from eastbound CR 524A will do so at level of service “A” during both time frames. Therefore the site driveway to CR 524A will operate within acceptable traffic engineering parameters for the design year.

### **SITE PLAN AND PARKING**

The *Site Plan*, prepared by WJH shows a single point of access to CR 524A and 3 flex space buildings totaling 70,722 SF of building area. Based on Howell Township ordinance requirements of 1 parking space per 300 SF for office space (44 spaces required) and 1 space per 5,000 SF for warehouse space (12 spaces required), a total of 56 parking spaces are required whereas 111 spaces are provided. Parking is well distributed around the site.

### **CONCLUSIONS**

It is concluded based on the analysis set forth in this report, that a *Use Variance* and a *Site Plan* to permit 13,072 SF of office space and 57,650 SF of warehouse space on the noted property can be approved without having an adverse or detrimental impact on traffic conditions in the area. The site driveway to CR 524A will operate at an acceptable level of service “B” for exiting movements for both the AM and PM peak hours. Left turns into the site driveway will operate at level of service “A” during both time frames.

The *Site Plan* itself has been properly designed with respect to adherence to proper traffic engineering principles and the number of parking spaces required (56) is substantially exceeded as 111 are provided.



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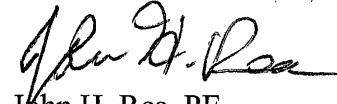
Howell Township Zoning Bd. of Adj.

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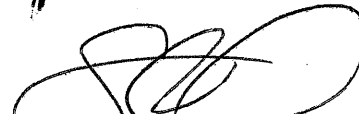
July 27, 2020

A representative from MRA will be in attendance at an upcoming Howell Township Zoning Board of Adjustment meeting to provide expert testimony and to answer any questions board members, board experts or the public may have.

Very truly yours,



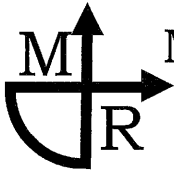
John H. Rea, PE  
Principal



Scott T. Kennel  
Sr. Associate

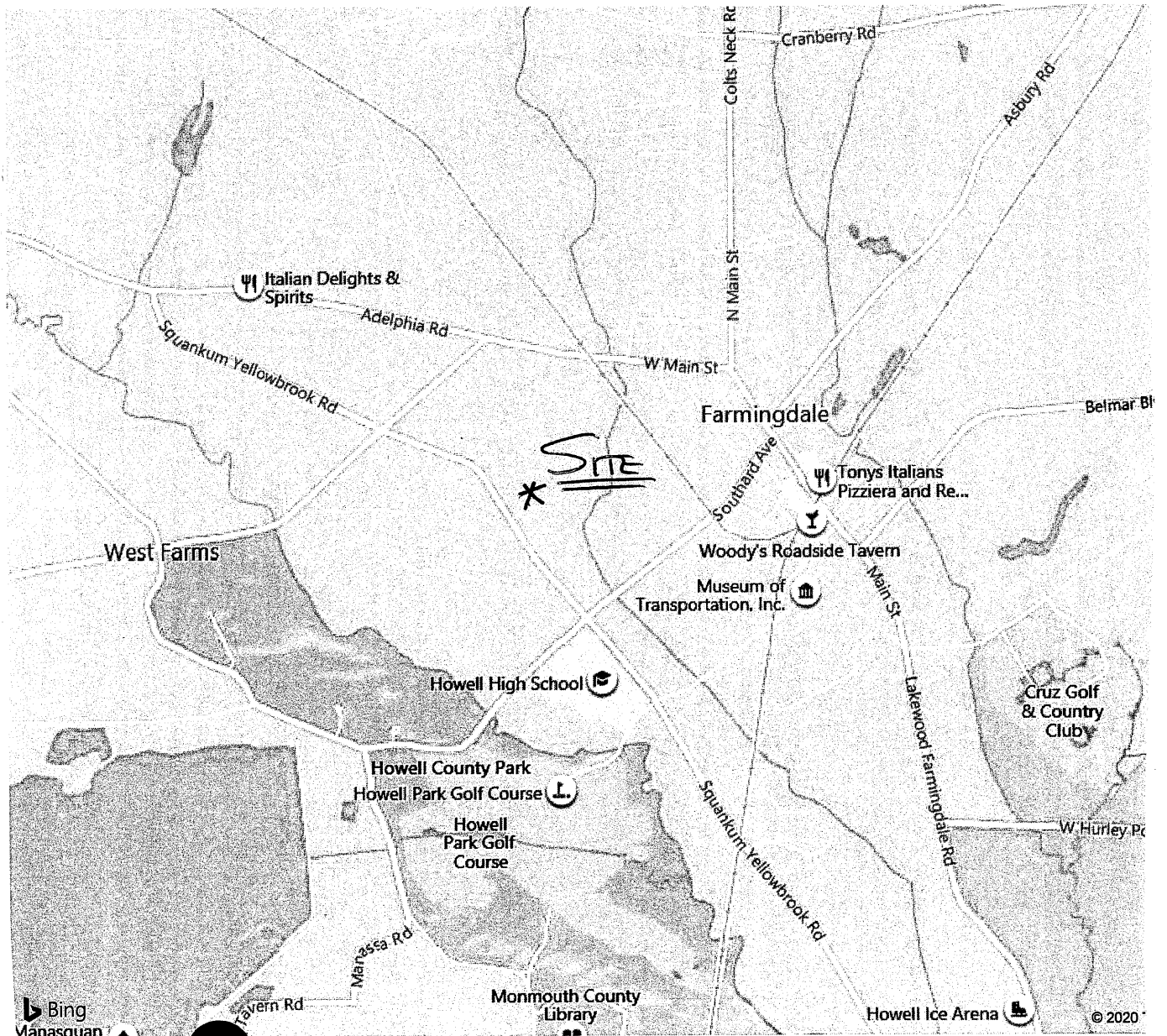
cc: Andrew Werbler, Esq.  
Walter Hopkin, PE

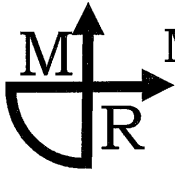
# APPENDIX



SUBJECT:

SITE LOCATION MAP





SUBJECT:

EXISTING AM PSH (PM PSH) TRAFFIC VOLUMES

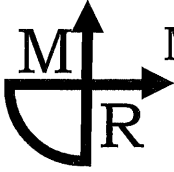
CR 524A  
← 225(350)  
SQUANKUM-YELLOWBROOK  
ROAD  
↑ (165)295

SITE



LEGEND: ← AM PSH(PM PSH)





McDONOUGH & REA ASSOCIATES

TRAFFIC AND TRANSPORTATION CONSULTING

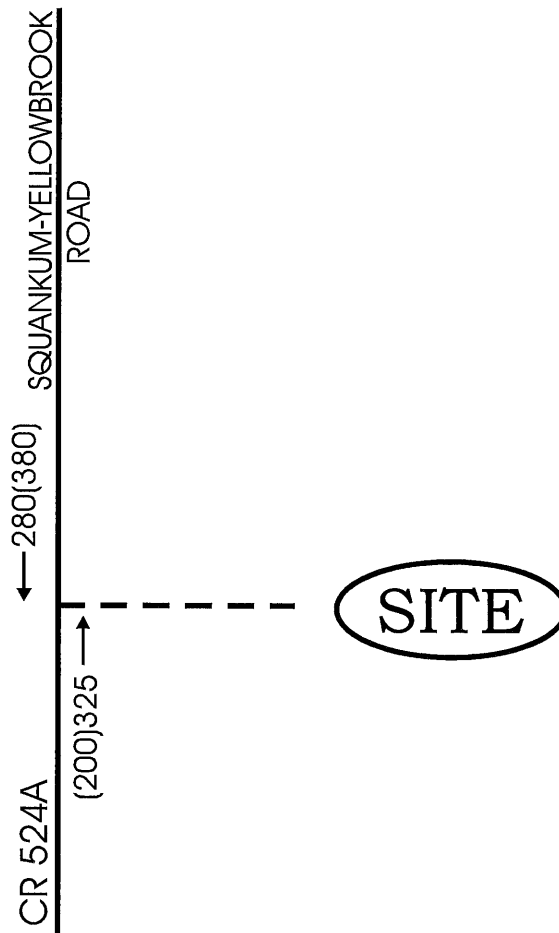
FIGURE 4

JOB NO.  
20-160

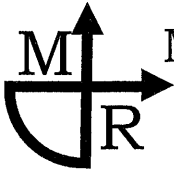
DATE:  
JUNE 2020

SUBJECT:

2025 PRE - DEVELOPMENT TRAFFIC VOLUMES

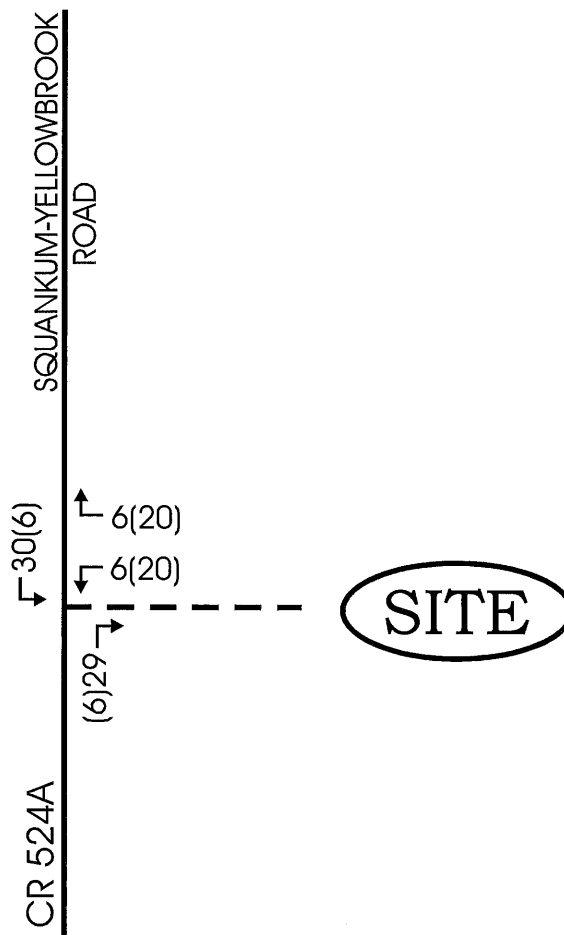


LEGEND: ← AM PSH(PM PSH)

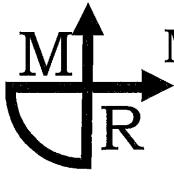


SUBJECT:

SITE GENERATED TRAFFIC VOLUMES

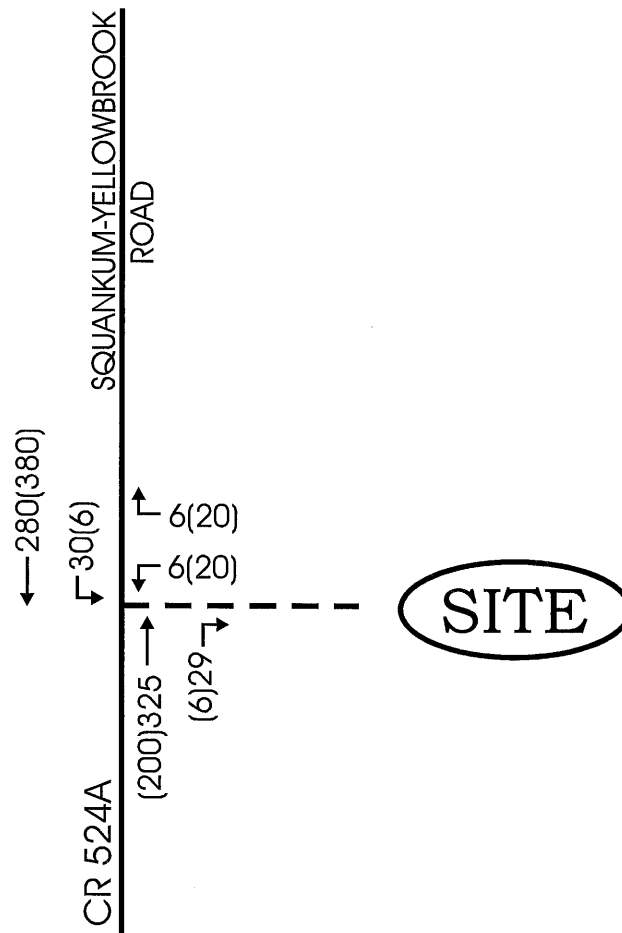


LEGEND: ← AM PSH(PM PSH)



SUBJECT:

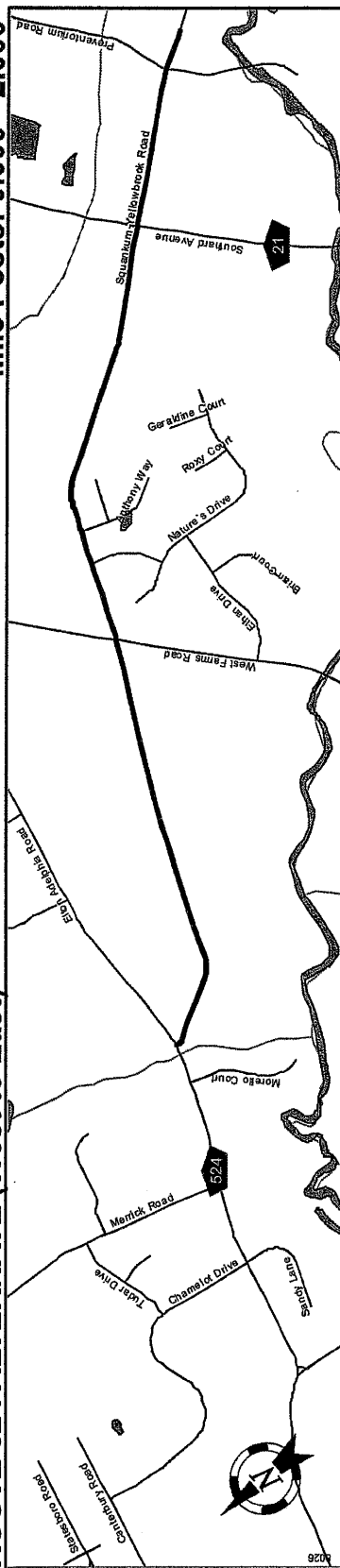
2025 POST - DEVELOPMENT TRAFFIC VOLUMES



LEGEND: ← AM PSH (PM PSH)

**ROUTE 524 ALTERNATE (West to East)**

**Mile Posts: 0.000 - 2.000**



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	
Interstate Route US Route NJ Route County Road Interchange Number Grade Separated Interchange Traffic Signal Traffic Monitoring Sites Road Underpass Road Overpass	287 22 33 689 2 [Symbol] [Symbol] [Symbol] [Symbol] [Symbol] [Symbol]
Street Name	Secondary Direction Primary Direction
Jurisdiction	Howell Twp, Monmouth Co
Functional Class	Urban Major Collector
Federal Aid - NHS SY	STP
Control Section	
Speed Limit	45
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	26
Shoulder	6
Traffic Volume	2
Traffic Sta. ID	24
Structure No.	6
Enlarged Views	

Street Name	Squankum-Yellowbrook Road
Jurisdiction	County
Functional Class	Urban Major Collector
Federal Aid - NHS SY	STP
Control Section	
Speed Limit	45
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	26
Shoulder	6
Traffic Volume	2
Traffic Sta. ID	24
Structure No.	6
Enlarged Views	

**SRI = 00000524A**

Date last inventoried: November 2012

Begin Rt. 524 Alternate MP=0.00

STONE QUEST  
 ROUTE 524 & ROUTE 524A  
 HOWELL TOWNSHIP, MONMOUTH COUNTY  
 MRA JOB 18-264 TUESDAY AM COUNT

McDonough & Rea Associates  
 1431 Lakewood Road Suite C  
 Manasquan NJ 08736  
 (732) 528-7076

File Name : 18264 rt 524 & squankum am1  
 Site Code : 00018264  
 Start Date : 1/8/2019  
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS  
 Squankum-Yellowbrook Rd (CR 524a)

Start Time	Adelphia Rd (CR 524) Westbound			Northbound			Eastbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
07:00 AM	2	43	45	50	0	50	20	66	101	196
07:15 AM	2	39	41	66	0	66	28	75	127	234
07:30 AM	1	37	38	87	1	88	36	8	47	173
07:45 AM	1	48	49	84	0	84	35	2	53	186
Total	6	167	173	287	1	288	119	165	328	789
08:00 AM	3	40	43	68	3	71	49	19	76	190
08:15 AM	0	34	34	67	0	67	29	13	47	148
08:30 AM	1	43	44	62	0	62	37	19	64	170
08:45 AM	0	24	24	59	0	60	37	20	67	151
Total	4	141	145	256	3	260	152	71	254	659
Grand Total	10	308	318	543	4	548	271	236	582	1448
Approch %	3.1	96.9		99.1	0.2		46.6	40.5		
Total %	0.7	21.3	22.0	37.5	0.1	37.8	18.7	16.3	40.2	

Start Time	Adelphia Rd (CR 524) Westbound			Squankum-Yellowbrook Rd (CR 524a) Northbound			Adelphia Rd (CR 524) Eastbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
07:00 AM to 08:45 AM - Peak 1 of 1	6	167	173	287	1	288	119	165	328	789
Intersection	3.5	96.5	41	99.7	0.3	66	36.3	50.3	127	234
Volume	2	39	41	66	0	66	28	75	127	0.843
07:15 Volume										
Peak Factor										
High Int. Volume	1	48	49	87	1	88	07:15 AM	75	127	
Peak Factor			0.883			0.818	28		0.646	

STONE QUEST  
 ROUTE 524 & ROUTE 524A  
 HOWELL TOWNSHIP, MONMOUTH COUNTY  
 MRA JOB 18-264 TUESDAY PM COUNT

McDonough & Rea Associates  
 1431 Lakewood Road Suite C  
 Manasquan NJ 08736  
 (732) 528-7076

File Name : 18264 rt 524 & squankum pm1  
 Site Code : 00018264  
 Start Date : 1/8/2019  
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	Adelphia Rd (CR 524) Westbound				Squankum-Yellowbrook Rd (CR 524a) Northbound				Adelphia Rd (CR 524) Eastbound				
	Left	Thru	App. Total	Int. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Int. Total
04:00 PM	2	42	44	44	1	48	1	50	45	42	16	103	197
04:15 PM	2	36	38	38	0	33	1	34	37	60	13	110	182
04:30 PM	4	44	48	48	0	47	0	47	44	63	20	127	222
04:45 PM	3	38	41	41	0	31	1	32	32	53	18	103	176
Total	11	160	171	171	1	159	3	163	158	218	67	443	777
05:00 PM	2	55	57	57	0	45	0	45	36	66	15	117	219
05:15 PM	5	44	49	49	1	32	0	33	39	69	16	124	206
05:30 PM	1	41	42	42	0	28	0	28	41	73	14	128	198
05:45 PM	1	37	38	38	0	24	0	24	38	38	2	78	140
Total	9	177	186	186	1	129	0	130	154	246	47	447	763
Grand Total	20	337	357	357	2	288	3	293	312	464	114	890	1540
Approch %	5.6	94.4			0.7	98.3	1.0		35.1	52.1	12.8		
Total %	1.3	21.9	23.2		0.1	18.7	0.2	19.0	20.3	30.1	7.4	57.8	

Start Time	Adelphia Rd (CR 524) Westbound				Squankum-Yellowbrook Rd (CR 524a) Northbound				Adelphia Rd (CR 524) Eastbound				
	Left	Thru	App. Total	Int. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1													
Intersection	14	181	195	195	1	155	1	157	151	251	69	471	823
Volume	7.2	92.8	48	48	0.6	98.7	0.6	47	32.1	53.3	14.6	127	222
04:30 Volume	4	44	48	48	0	47	0	47	44	63	20	127	222
Peak Factor													0.927
High Int. Volume	2	55	57	57	0	47	0	47	04:30 PM	63	20	127	
Peak Factor			0.855					0.835	44			0.927	



# New Jersey Department of Transportation

## Daily Volume from 04/11/2016 through 04/14/2016

Site Names: 091332, Squankum-Yellowbrook Road-3.67, 00000524A\_, Howell T  
 County: MONMOUTH  
 Funct. Rural Major Collector  
 Location: Bet New Castle St and Rt 547 Squankum Rd

Seasonal Factor Group: RG4\_FC7  
 Daily Factor Group: RG4\_FC7  
 Axle Factor Group: RG4\_FC7  
 Growth Factor Group: RG4\_FC7

	Sun 04/10/2016		Mon 04/11/2016		Tue 04/12/2016		Wed 04/13/2016		Thu 04/14/2016		Fri 04/15/2016		Sat 04/16/2016	
	ROAD	E	ROAD	W	ROAD	E	ROAD	W	ROAD	E	ROAD	W	ROAD	E
00:00														
01:00														
02:00														
03:00														
04:00														
05:00														
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16:00														
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18:00														
19:00														
20:00														
21:00														
22:00														
23:00														
Volume	2,967	1,133	1,834	3,063	3,250	7,079	3,420	3,659	2,550	1,586	964			
AM Peak Vol				749	530	239	712	487	236	779	546	236		
AM Peak Fct				0.79	0.84	0.74	0.72	0.73	0.75	0.87	0.90	0.80		
AM Peak Hr				7:00	7:00	7:30	7:15	7:00	7:30	7:00	7:00	7:15		
PM Peak Vol				630	224	419	747	277	515					
PM Peak Fct				0.88	0.85	0.85	0.93	0.95	0.93					
PM Peak Hr				16:45	17:15	16:45	16:45	15:45	16:45					
Seasonal Fct	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072		
Daily Fct	0.957	0.957	0.957	0.995	0.995	0.995	0.966	0.966	1.038	1.038	1.038	1.038		
Axle Fct	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484		
Pulse Fct	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000		



**LEVEL OF SERVICE CRITERIA  
FOR  
TWO-WAY STOP-CONTROLLED INTERSECTIONS<sup>1</sup>**

<u>Level of Service</u>	<u>Average Control Delay</u>
A	$\leq 10.0$ Seconds Per Vehicle
B	$> 10.0$ and $\leq 15.0$ Seconds Per Vehicle
C	$> 15.0$ and $\leq 25.0$ Seconds Per Vehicle
D	$> 25.0$ and $\leq 35.0$ Seconds Per Vehicle
E	$> 35.0$ and $\leq 50.0$ Seconds Per Vehicle
F	$> 50.0$ Seconds Per Vehicle

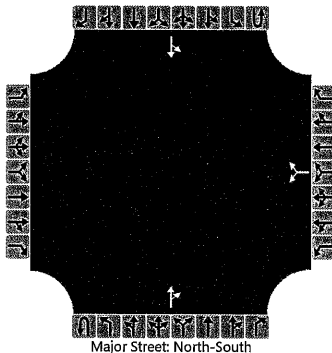
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<sup>1</sup> Transportation Research Board, Highway Capacity Manual 2010, National Research Council, Washington, DC, 2010.

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK	Intersection	CR 524A & SITE ACCESS				
Agency/Co.	MRA	Jurisdiction					
Date Performed	6/11/2020	East/West Street	SITE ACCESS				
Analysis Year	2025	North/South Street	CR 524A				
Time Analyzed	PM	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	20-160PFB BUILD						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR			LT	
Volume (veh/h)						20		20			200	6		6	380	
Percent Heavy Vehicles (%)						20		20						20		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.60		6.40						4.30		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.68		3.48						2.38		

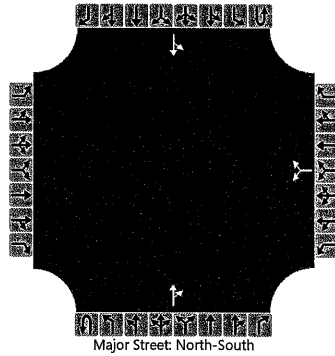
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						44								7		
Capacity, c (veh/h)						525								1240		
v/c Ratio						0.08								0.01		
95% Queue Length, Q <sub>95</sub> (veh)						0.3								0.0		
Control Delay (s/veh)						12.5								7.9		
Level of Service (LOS)						B								A		
Approach Delay (s/veh)					12.5								0.2			
Approach LOS					B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK	Intersection	CR 524A & SITE ACCESS				
Agency/Co.	MRA	Jurisdiction					
Date Performed	6/11/2020	East/West Street	SITE ACCESS				
Analysis Year	2025	North/South Street	CR 524A				
Time Analyzed	AM	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	20-160AFB BUILD						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR			LT	
Volume (veh/h)						6		6			325	29			30	280
Percent Heavy Vehicles (%)						20		20							20	
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1	
Critical Headway (sec)						6.60		6.40							4.30	
Base Follow-Up Headway (sec)						3.5		3.3							2.2	
Follow-Up Headway (sec)						3.68		3.48							2.38	

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						13									33	
Capacity, c (veh/h)						443									1074	
v/c Ratio						0.03									0.03	
95% Queue Length, Q <sub>95</sub> (veh)						0.1									0.1	
Control Delay (s/veh)						13.4									8.5	
Level of Service (LOS)						B									A	
Approach Delay (s/veh)					13.4								1.1			
Approach LOS					B											