

### Traffic and Transportation Consulting

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

October 6, 2021

Neptune Township Zoning Board of Adjustment 25 Neptune Boulevard Neptune, NJ 07753

Re:

Flex Space Office/Warehouse

Lot 3 in Block 3101

Neptune Township, Monmouth County

MRA File No. 21-249

### 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 a flex space office/warehouse building on the noted property. The property is located on the north side of New Jersey State Route 33, just east of its intersection with Jumping Brook Road as shown on *Figure 1*, a *Site Location Map* in the *Appendix*.

Plans prepared by InSite Engineering (ISE) show a building containing the following elements:

- > 27,411 SF of warehouse space
- > 15,009 SF of office space

Access to Route 33 is proposed via 2 driveway connections; 1 on the east side of the building and 1 on the west side of the building. The property is located in the *C-5 Commercial Zone*; therefore, a *Use Variance* is requested for the flex/office/warehouse space.

### **SCOPE OF STUDY**

In order to prepare a thorough *Traffic Impact Analysis* for this proposal, MRA conducted the following tasks:

- 1. Made field visits to the site to establish existing roadway and traffic conditions in the area.
- 2. Obtained historical traffic volume data along Route 33 from the New Jersey Department of Transportation (NJDOT).

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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- 3. Prepared estimates of traffic to be generated by the warehouse and office space based upon Institute of Transportation Engineers (ITE) data.
- 4. Distributed site generated traffic east and west along Route 33 in accordance with anticipated origins and destinations of site traffic.
- 5. Projected traffic volumes to a design year 2023 after consulting the NJDOT's *Historical Growth Rate* data for the area.
- 6. Conducted level of service capacity analyses for the site driveway in accordance with *Highway Capacity Manual* procedures.
- 7. Compared the traffic to be generated by the office/warehouse space to traffic that would be generated by a permitted commercial use.
- 8. Reviewed the *Site Plan* with respect to adherence to proper traffic engineering principles.

The following report sets forth the database accumulated and the conclusions reached with respect to the warehouse/office project.

### **EXISTING CONDITIONS**

The subject property is located on the north side of Route 33 just east of the signalized intersection at Jumping Brook Road. It has approximately 609 feet of frontage along Route 33 and contains approximately 4.5 acres. Route 33 is an east/west State arterial highway under the jurisdiction of NJDOT. It provides for 2 travel lanes in each direction without shoulders in the vicinity of the subject property. The nearest traffic signal control is located at Jumping Brook Road just west of the subject property

## **EXISTING TRAFFIC VOLUMES**

Traffic volume data was obtained after reviewing historical data published by the NJDOT. Specifically, automatic traffic counts conducted along Route 33 between Jumping Brook Road and West Bangs Avenue in the fall of 2018 were reviewed. *Figure 2* in the *Appendix*, illustrates existing October 2018 NJDOT traffic volumes passing the site frontage during the critical AM and PM peak street hours.



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### TRIP GENERATION AND DISTRIBUTION

Estimates of traffic to be generated by the office and warehouse space were made after consulting the  $10^{th}$  Edition of the ITE Trip Generation Manual. Table I illustrates anticipated traffic generation from the property during the critical morning and afternoon peak hours.

TABLE I
TRIP GENERATION

<u>Use</u>		AM F	<u>SH</u>		PM P	<u>SH</u>
	<u>IN</u>	<b>O</b> UT	TOTAL	<u>IN</u>	OUT	TOTAL
15,009 SF Office	15	3	18	3	15	18
27,411 SF Warehouse	<u>22</u>	_7	<u>29</u>	_8	<u>23</u>	<u>31</u>
Totals	37	10	47	$\overline{11}$	38	49

With respect to the anticipated distribution of site generated traffic, a review was made of access to higher order roadways such as the Garden State Parkway, Route 33, Route 34, Route 18, etc. Based on this review, traffic was distributed as follows

- $\triangleright$  2/3 to and from the west on Route 33
- $\triangleright$  1/3 to and from the east on Route 33

Site generated and distributed traffic flows are shown on Figure 3 the Appendix.

### Analysis of Future Traffic

A design year of 2023 was assumed for the project (a 2 year build-out). The NJDOT's background traffic growth rate data for the area was consulted and a growth rate of 1.0 percent per year was added to base 2018 traffic volumes which were expanded to *no-build* 2023 volumes (a conservative multiplier of 1.07). Design year 2023 *no-build* traffic volumes are shown on *Figure 4* in the *Appendix*. Site generated and distributed traffic was 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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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 (HCS7)*, release 7.9.5.

The site access points to Route 33 were analyzed for projected levels of service for the 2023 design year. Based on a review of NJDOT access control restrictions for the property, only 1 entrance/exit will be permitted to and from the property. Therefore, the west driveway was assumed to be an exit-only driveway and the east driveway, an entrance-only driveway. This access configuration will permit full access around the building and ease of loading for deliveries.

Findings were that exiting movements to Route 33 from the west driveway will operate at level of service "C" during the AM peak street hour and level of service "D" during the PM peak street hour. Left turn entry movements at the east driveway will operate at level of service "B" during both the AM and PM peak street hours. Therefore, the site driveways will operate within acceptable traffic engineering parameters.

### TRIP GENERATION COMPARISON

As previously indicated, the property is located in the C-5 Commercial Zone and a Use Variance is required for the office/warehouse space. Uses in the C-5 Commercial Zone, which are predominantly retail in nature, will generate higher peak hour traffic volumes than the proposed use as shown on the Table below. A 28,500 SF retail strip center is a permitted use and can fit on the property.

# TABLE II TRIP GENERATION PERMITTED USE (28,500 SF RETAIL) VS. PROPOSED TOTAL TRIPS

<u>Use</u>	AM PSH	PM PSH	SAT. PH
Permitted 28,500 SF Retail	86	215	230
Proposed. Office/Warehouse	<u>47</u>	<u>49</u>	<u>10</u>
Difference	-39	-166	-220



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### SITE PLAN & PARKING

The Site Plan, prepared by ISE, shows full access around the building. A total of 53 parking spaces are required under the Neptune ordinance and 54 spaces are provided. Truck loading areas are located to the north side of the building away from primary employee/visitor/customer spaces.

### **CONCLUSIONS**

It is concluded, based on the analysis set forth in this report that plans to construct 27,411 SF of warehouse space and 15,009 SF of office space on the noted property can be approved without having an adverse and negative impact on traffic conditions in the area. The proposed uses will generate less peak hour traffic than a permitted use in the *C-5 Commercial Zone*. Furthermore, levels of service at the driveways to Route 33 will be within acceptable traffic engineering parameters.

The Site Plan itself has been properly designed with respect to ingress and egress, adequate parking, full circulation around the building and separation for truck loading areas from primary customer/visitor/employee parking spaces.

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

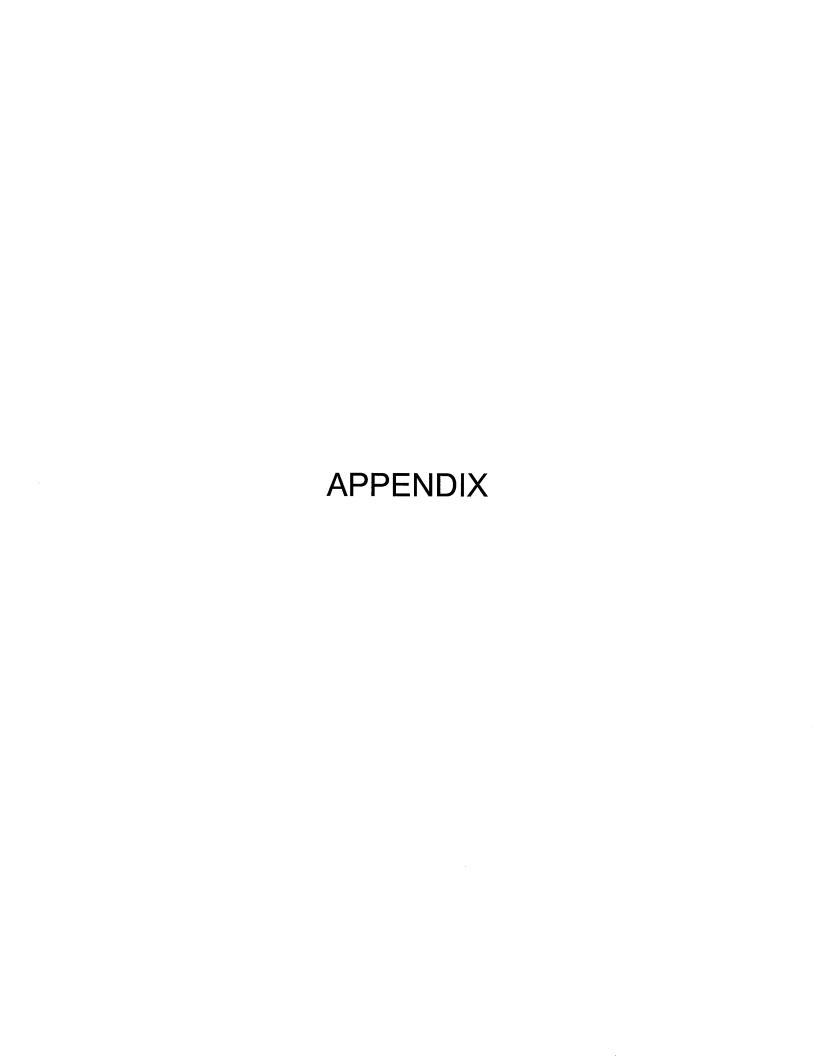
Very truly yours,

John H. Rea, PE

Principal

Scott T. Kennel Sr. Associate

cc: Patrick Ward, PE Jennifer S. Krimko, Esq. Jacob Lipschitz





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FIGURE

JOB NO.

21-249 SE

DATE: SEPT 2021

SUBJECT:

# NEPTUNE TWP. FLEX SPACE - ROUTE 33 SITE LOCATION MAP

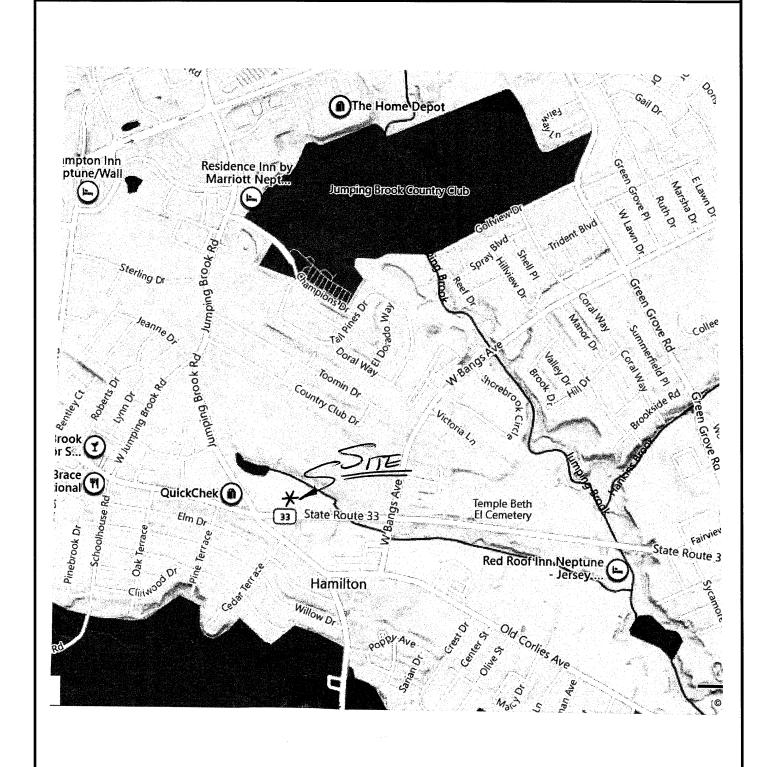




FIGURE 2

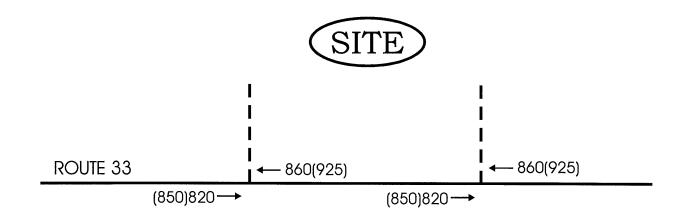
TRAFFIC AND TRANSPORTATION CONSULTING

JOB NO. 21-249

DATE: SEPT 2021

NEPTUNE TWP. FLEX SPACE - ROUTE 33 EXISTING AM[8-9am] (PM)[5-6pm] OCT. 2018 NJDOT TRAFFIC VOLUMES







\_ I

FIGURE 3

TRAFFIC AND TRANSPORTATION CONSULTING

JOB NO.

DATE:

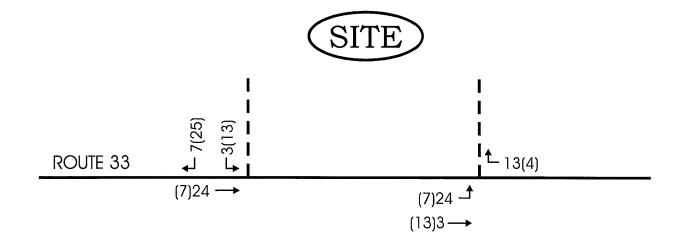
21-249 SE

SEPT 2021

SUBJECT:

NEPTUNE TWP. FLEX SPACE - ROUTE 33 SITE GENERATED TRAFFIC VOLUMES







TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 4

JOB NO.

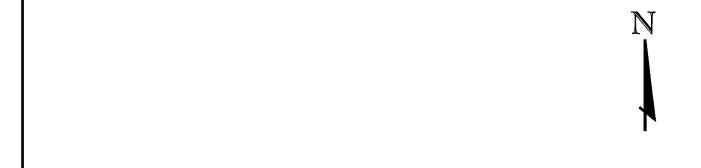
DATE:

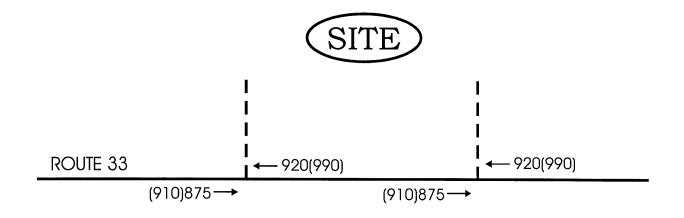
21-249

SEPT 2021

SUBJECT:

NEPTUNE TWP. FLEX SPACE - ROUTE 33 2023 NO - BUILD TRAFFIC VOLUMES







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FIGURE 5

JOB NO.

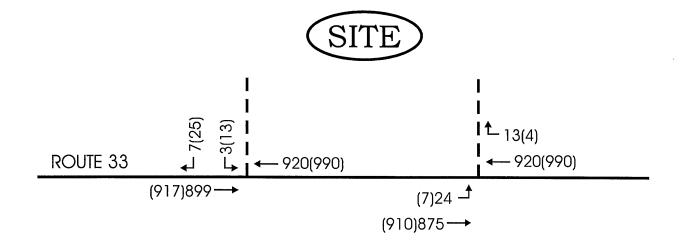
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DATE: SEPT 2021

SUBJECT:

NEPTUNE TWP. FLEX SPACE - ROUTE 33 2023 BUILD TRAFFIC VOLUMES



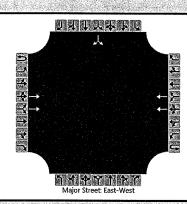


# LEVEL OF SERVICE CRITERIA FOR ${\bf TWo\text{-}Way\ Stop\text{-}Controlled\ Intersections}^1}$

<b>Level of Service</b>	<b>Average Control Delay</b>
A	≤ 10.0 Seconds Per Vehicle
В	$> 10.0$ 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

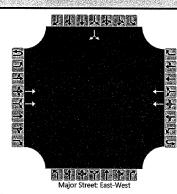
<sup>1</sup> Transportation Research Board, <u>Highway Capacity Manual 2010</u>, National Research Council, Washington, DC, 2010.

	HCS7 Two-Way Sto	p-Control Report	
General Information		Site Information	
Analyst	STK	Intersection	RT 33 & EGRESS
Agency/Co.	MRA	Jurisdiction	
Date Performed	9/8/2021	East/West Street	RT 33
Analysis Year	2023	North/South Street	EGRESS
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	21-249AFB-1		



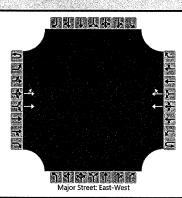
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	HCS7 Two-V	Vay Stop-Control Report	
General Information		Site Information	
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Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	21-249PFB-1		



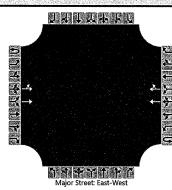
Approach		East	oound			West	bound			North	bound			South	bound	
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Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	. 0		0	0	0		0	1	0
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	HCS7 Two	-Way Stop-Control Report	
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Analysis Year	2023	North/South Street	INGRESS
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	21-249AFB-2		



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Project Description	21-249PFB-2		



Approach		Eastl	oound			West	bound			North	bound			South	bound	
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Follow-Up Headway (sec)		2.30														
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Approach LOS	4.5									W						

# New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 10/23/2018 to 10/29/2018

p18606,NJ 37 38.47,00000037\_\_\_ Site names:

Urban Principal Arterial - Other Funct Class: County:

Bet West Bangs Avenue and Jumping brook Road

Location:

194\_3U 194\_3U 194\_3U 194\_3U Seasonal Factor Grp: Daily Factor Grp: Axle Factor Grp: Growth Factor Grp:

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Sat, Oct 27, 2018	Ш	141	88	38	30	32	54	184	189	276	363	346	450	461	450	446	534	207	422	522	383	308	302	262	226	7,015	450	-	11:00	534	1	15: 00	1.005	1.049	.486	2.000
Sat,	Road	298	199	136	87	75	139	364	452	649	290	914	1,026	1,036	995	957	1,076	1,005	1,043	1,019	807	613	582	522	449	15,233	1,026	-	11: 00	1,076	1	15: 00	1.005	1.049	.486	2.000
8	 M	62	49	47	41	79	248	293	919	842	829	633	623	749	200	808	1,001	963	948	656	614	385	355	337	248	12,559	919	-	7: 00	1,001	1	15: 00	1.005	.889	.486	2.000
Fri, Oct 26, 2018	ш	77	22	32	27	52	141	475	715	782	009	547	979	681	681	714	831	887	893	720	521	410	323	296	237	11,326	782	-	8: 00	893	1	17: 00	1.005	688.	.486	2.000
Fri, O	Road	139	104	82	89	131	389	1,068	1,634	1,624	1,258	1,180	1,249	1,430	1,381	1,523	1,832	1,850	1,841	1,376	1,135	795	829	633	485	23,885	1,634	_	7: 00	1,850	1	16: 00	1.005	.889	.486	2.000
8	W	62	43	34	40	104	273	979	893	845	627	280	646	710	739	787	911	996	882	658	546	374	314	223	144	12,027	893	-	7: 00	996	1	16: 00	1.005	.940	.486	2.000
£ 25, 2018		78	35	33	28	41	133	470	720	808	889	265	571	638	638	713	782	880	872	702	484	367	295	180	143	10,891	808	_	8: 00	880	1	16: 00	1.005	.940		2.000
Thu, Oct 25,		140	78	29	89	145	406	960'	,613	1,653	,315	1,172	,217	,348	,377	,500	693	,846	1,754	996,	030	741	609	403	287	22,918 10	1,653	1	8: 00	1,846	1	16: 00	1.005	.940		2.000
	Road	73	35	27	32	111	251	660	888		,	697	•	830 1	818 1	726 1	951 1	924 1	946 1	590 1	520 1	376	294	191	118	12,435 22	888	+	7: 00	951 1	1	5: 00 16	1.005	.953		2.000 2
24, 2018	M	68	34	53	22	42	147	476	776				269	157	340	989	797	880	806	745	442		279	179	119	,274 12,	814	1	8: 00 7	880	1	16: 00 15	1.005 1.	. 953		2.000 2.
Wed, Oct 24,	Ш	141	69	56	54	153	398	, 136	664		1,526		,451	. 587	,458	,412	,748	804		335		755			237	11		1			1			. 953		
	Road		4	38		110 1		l	_					_			<u> </u>	1	3 1,752	1						9 23,709	1,677	1	0 8: 00	1,804	1	16: 00	1.005			0 2.000
, 2018	M						3 262	3 620					809				975	852	943	673	531				107	11,899	881		) 7: 00	915		15: 00	1.005	.980		2.000
Tue, Oct 23,	ш			22			136	493	744	830		635		582	625	731	834	872	884	684	501	358	274			10,869	830		8: 00	884		17: 00	1.005	.980		2.000
Tu	Road	140	70	9	69	159	398	1,113	1,625	1,697	1,299	1,222	1,098	1,235	1,288	1,490	1,809	1,824	1,827	1,357	1,032	741	296	407	212	22,768	1,697	1	8: 00	1,827	,	17: 00	1.005	.980	.486	2.000
2018	M																																			
Mon, Oct 22, 2018	ш																																			
Mor	Road																																			
018	M																																			
Sun, Oct 21, 2018	Ш																			_																
Sun,	Road																			_													1			
	L	00	00	90	00	00	00	00	90	00	00.	ê	90	ê	Ģ.	ę	8	, 0,	8	8	8	00	8	00	00	tai	ak Vol	ak Fct	ak Hr	ak Vol	ak Fct	ak Hr	nal Fct	Fot	Fct	3 Fct
		00:00	01:00	02:00	03:00	04:00	02:00	00:90	07:00	08:00	00:60	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Total	AM Peak Vol	AM Peak Fct	AM Peak Hr	PM Peak Vol	PM Peak Fct	PM Peak Hr	Seasonal Fct	Daily Fct	Axle Fct	Pulse Fct

# New Jersey Department of Transportation Short-term Hourly Traffic Volume for 10/23/2018 to 10/29/2018

p18606,NJ 37 38.47,00000037\_\_\_ MONMOUTH

Site names: County: Funct Class: Location:

Urban Principal Arterial - Other Bet West Bangs Avenue and Jumping brook Road

Seasonal Factor Grp: Daily Factor Grp: Axle Factor Grp: Growth Factor Grp:

rg4\_3U rg4\_3U rg4\_3U rg4\_3U

IL	Sun	Sun, Oct 28, 2018	2018	Mor	29	201	Tue,	Oct 30,	201	Wet	31,	201	Ì	Thu, Nov 1, 2018	2018		Fri, Nov 2, 2018	2018	Ϋ́	Sat, Nov 3, 2	2018
	Road	ш	Μ	Road	ш	Μ	Road	ш	M	Road	ш	8	Road	ш	≥	Road	ш	>	Road	щ	*
00:00	287	146	141	113	23	09															
01:00	228	105	123	74	34	40															
02:00	142	59	83	64	25	39															
03:00	100	45	55	69	26	43															
04:00	9/	36	40	155	47	108															
02:00	100	41	29	441	141	300															
00:90	288	160	128	1,092	469	623				<u> </u>											
07:00	452	205	247	1,563	705	858															
08:00	654	278	376	1,705	837	898															
00:60	935	438	497	1,215	573	642															
10:00	1,020	436	284	1,190	584	909															
11:00	1,256	250	902	1,075	514	561															
12:00	1,308	638	029	1,238	588	650															
13:00	1,247	566	681	1,270	622	648															
14:00	1,215	222	099	1,378	640	738															
15:00	1,203	554	649	1,704	805	899															
16:00	1,172	566	909	1,747	821	926															
17:00	086	486	494	1,725	851	874															
18:00	866	540	458	1,285	727	258															
19:00	772	356	416	876	461	517															
20:00	681	306	375	202	350	357															
21:00	395	175	220	530	256	274															
22:00	307	137	170	381	183	198															
23:00	243	121	122	242	132	110															
Total	16,059	7,499	8,560	21,941	10,444	11,497															
AM Peak Vol	1,256	220	200	1,705	837	898															
AM Peak Fct	-	+	1	1	-	1															
AM Peak Hr	11: 00	11: 00	11: 00	8: 00	8: 00	8: 00															
PM Peak Vol	1,308	638	189	1,747	851	926															
PM Peak Fct	1	-	1	1	_	1															
PM Peak Hr	12: 00	12: 00	13: 00	16: 00	17: 00	16: 00															
Seasonal Fct	1.005	1.005	1,005	1.005	1,005	1.005															
Daily Fct	1.299	1.299	1.299	1.015	1.015	1.015															
Axle Fct	.486	.486	.486	.486	.486	.486															
Pulse Fct	2.000	2,000	2.000	2.000	2.000	2.000															

20,495

ROAD AADT

9,690

	ITE Land Use: 150, Warehousing											$\neg$
Size of Development: 27,	27,500 SF		10th									
Time Period Average Rate	<u>Sate</u> Studies	Avg. Size	낊	Trips		Equation	ıtion		Trips	-	Split	<b>1</b> -1
Weekday Daily 1.74	29	285	0.93	47.9	≛	1.580	+(×)	(x)+ 45.540	89.0	20	20	Ö
AM Peak Street Hour 0.17	34	451	69.0	4.7	<u>  </u>	0.120	+(x)	(x)+ 25.320	28.6	22	7 23	წ.
PM Peak Street Hour 0.19	47	400	0.65	5.2	<u>"</u>	0.120	+(×)	(x)+27.820	31.1	27	7 73	က
AM Peak Hour of Generator 0.22	23	274	0.85	6.1	쁜	0.110	+(×)	(x)+ 30.070	33.1	65	35	33
PM Peak Hour of Generator 0.24	25	275	0.91	9.9	<u>!!</u>	0.150	+ (×)	(x)+ 22.520	26.6	24		9/
Saturday Daily 0.15	က	226	Ŋ	1.4		Not Given	iven		N/A	20	22	Ö
Saturday Peak Hour of Generator 0.05	2	129	ŊĠ	4.1		Not Given	iven		A/N	64		36
Sunday Daily 0.06	က	226	Ů	1.7		Not Given	iven		N/A	20	20	Ö
Sunday Peak Hour of Generator 0.04	2	129	NG	1.1		Not Given	iven		N/A	52	2 48	φ
_												

ITE Land Use: 710, General Office	710, General Of	fice Building	Tr.	-								
Size of Development:	15,100 SF	SF		10th								
Time Period	Average Rate	Studies	Avg. Size	<u></u> 24	Trips		Equ	Equation		Trips	Split	<b>=</b>
Weekday Daily	9.74	99	171	0.83	147.1	Ln(T)=	0.970	Ln(x)+ 2.500	200	169.6	50 50	20
AM Peak Street Hour	1.16	35	117	0.85	17.5	<u>  </u>	0.940	(x)+ 26.490	3.490	40.7	98	4
PM Peak Street Hour	1.15	32	114	0.88	17.4	Ln(T)=	0.950	Ln(x)+ 0.360	360	18.9	16	84
AM Peak Hour of Generator	1.47	228	209	0.84			0.880	Ln(x)+ 1.060	090	31.5	88	12
PM Peak Hour of Generator	1.42	243	205	0.82	21.4	<u>"</u>	1.100		5.390	82.0	18 82	82
Saturday Daily	2.21	5	94	ŊŖ	33.4		Not (	Not Given		N/A	22	20
Saturday Peak Hour of Generator	0.53	က	82	NG	8.0		Not (	Not Given		A/N	54	46
Sunday Daily	0.70	2	94	NG	10.6		Not C	Not Given		A/A	20	20
Sunday Peak Hour of Generator	0.21	3	82	NG	3.2		Not (	Not Given		N/A	28	42

ITE Land Use: 820, Shopping Center	820, Shopping C	enter										
Size of Development:	28,500 SF	SF		10th								
Time Period	Average Rate	Studies	Avg. Size	낌	Trips		Equ	Equation		Trips	Split	-1
Weekday Daily	37.75	147	453	0.76	1075.9	Ln(T)=	0.680	0.680 Ln(x)+ 5.570	5.570	2560.4	50 50	00
AM Peak Street Hour	0.94	84	351	0.50	26.8	<u>"</u>	0.500	* <u>×</u>	(x)+ 151.780	166.0	62	38
PM Peak Street Hour	3.81	261	327	0.82	108.6	Ln(T)=	0.740	0.740 Ln(x)+ 2.890	2.890	214.6	48 52	22
AM Peak Hour of Generator	3.00	47	323	0.71	85.5	<u>"</u>	2.760	(x)+ 77.280	77.280	155.9	54	46
PM Peak Hour of Generator	4.21	53	298	92.0	120.0	120.0 Ln(T)=	0.720	0.720 Ln(x)+ 3.020	3.020	228.6	20	20
Saturday Daily	46.12	28	602	0.71	1314.4	1314.4 Ln(T)=	0.620	0.620 Ln(x)+ 6.240	6.240	4092.6	50	20
Saturday Peak Hour of Generator	4.50	119	416	0.87	128.3	_(T)nJ	0.790	0.790  Ln(x)+ 2.790	2.790	229.6	52 4	48
Sunday Daily	21.10	30	509	NG	601.4		Not	Not Given		A/A	20	20
Sunday Peak Hour of Generator	2.79	24	382	NG	79.5		Not	Not Given		A/N	49	51
PM Pass-By Percentage						Ln(T)=	-0.291	-0.291 Ln(x)+ 5.001	5.001	56.0		
Saturday Pass-By Percentage						=1	-0.024	+(x)	(x)+ 38.591	37.9		