

**MEMORANDUM**

Ref: 2041A

To: Charlie Zilch  
S.E.C. & Associates, Inc.

From: Stephen G. Pernaw, P.E., PTOE

Subject: Proposed Residential Condominiums  
Sandown, New Hampshire

Date: September 16, 2020

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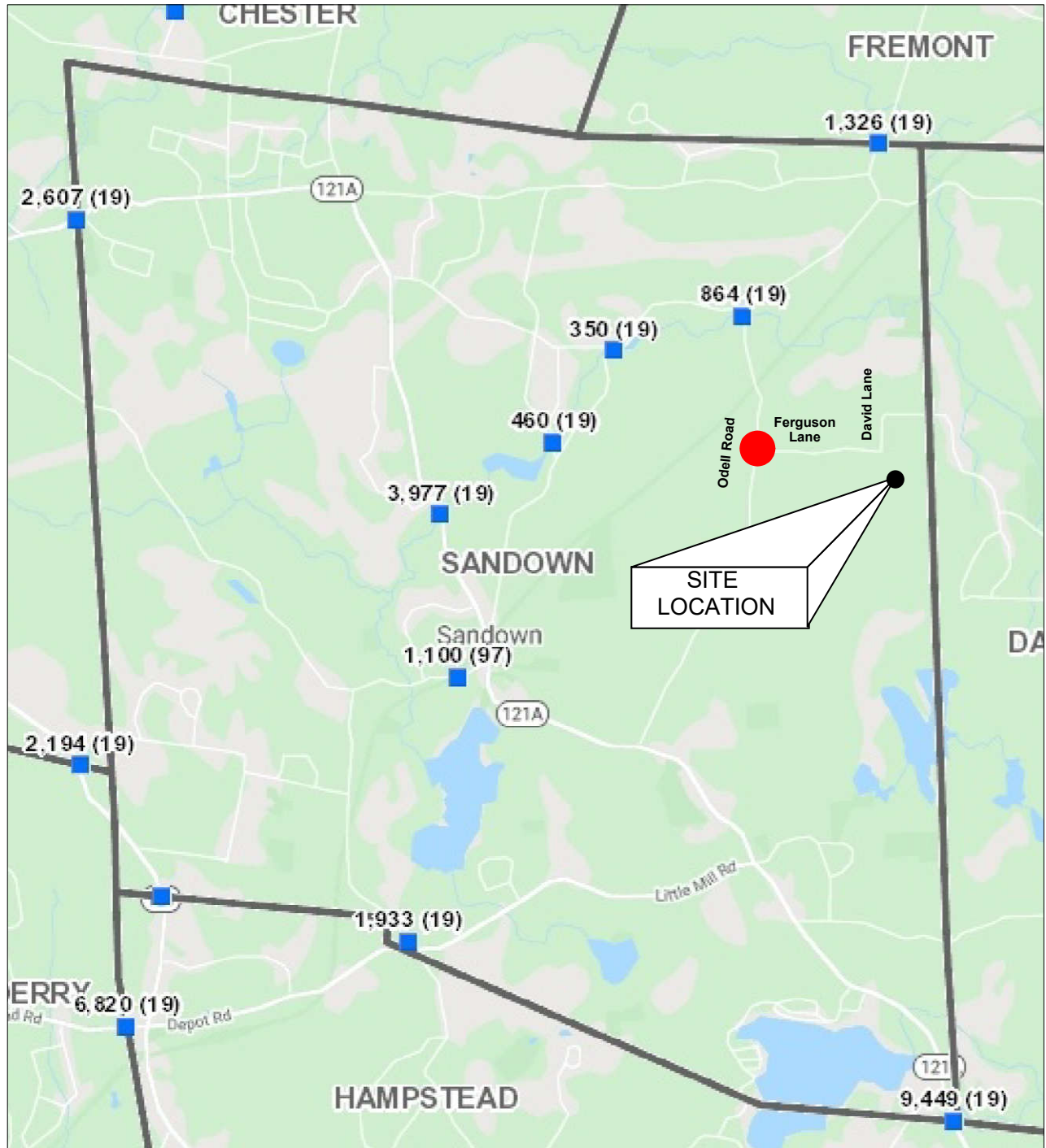
As requested, Pernaw & Company, Inc. has conducted this “*Traffic Evaluation*” for the proposed residential condominium project located adjacent to the Ferguson Lane/David Lane intersection in Sandown, New Hampshire. The purpose of this memorandum is to summarize the results our research of available traffic count data in the area, the new traffic counts that were conducted at the Odell Road/Ferguson Lane intersection, our trip generation and trip distribution analyses, as well as an evaluation of post-development traffic operations. To summarize:

**PROPOSED DEVELOPMENT**

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According to the plan entitled “*Hoytford Hills – Open Space Multi-Family Condominium Development*” prepared by S.E.C. & Associates, Inc. (see Attachment 1), the proposed development involves the construction of 13 condominium building that will contain a total of 48 dwelling units on a parcel of land that is situated at the terminus of Ferguson Lane. Nine buildings will contain four dwelling units and four buildings with three dwelling units. Access to the 10 of the 13 condominium buildings will be provided via a private loop road (Cole Circle) with a secondary loop road that will provide access the remaining three buildings.

Figure 1 shows the location of the subject site with respect to the area roadway system, as well as the location of the most recent traffic count conducted in the area by the NHDOT, and the intersection count conducted by our office.



● = INTERSECTION TURNING MOVEMENT COUNT (PERNAW & CO., INC.)

■ = AUTOMATIC TRAFFIC RECORDER LOCATION (NHDOT)



2041A

Figure 1

Site Location

Traffic Evaluation, Proposed Residential Development, Sandown, New Hampshire

## **EXISTING TRAFFIC VOLUMES**

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Research at the NHDOT revealed that there is a short-term Automatic Traffic Recorder count station on Odell Road, located over the Exeter River. This count station is located approximately 0.6 miles north of the Odell Road/Ferguson Lane intersection. According to the NHDOT reports that section of Odell Road carried an Annual Average Daily Traffic (AADT) volume of approximately 864 vehicles per day (vpd) in 2019, down from 973 vpd in 2018 (see Attachment 2).

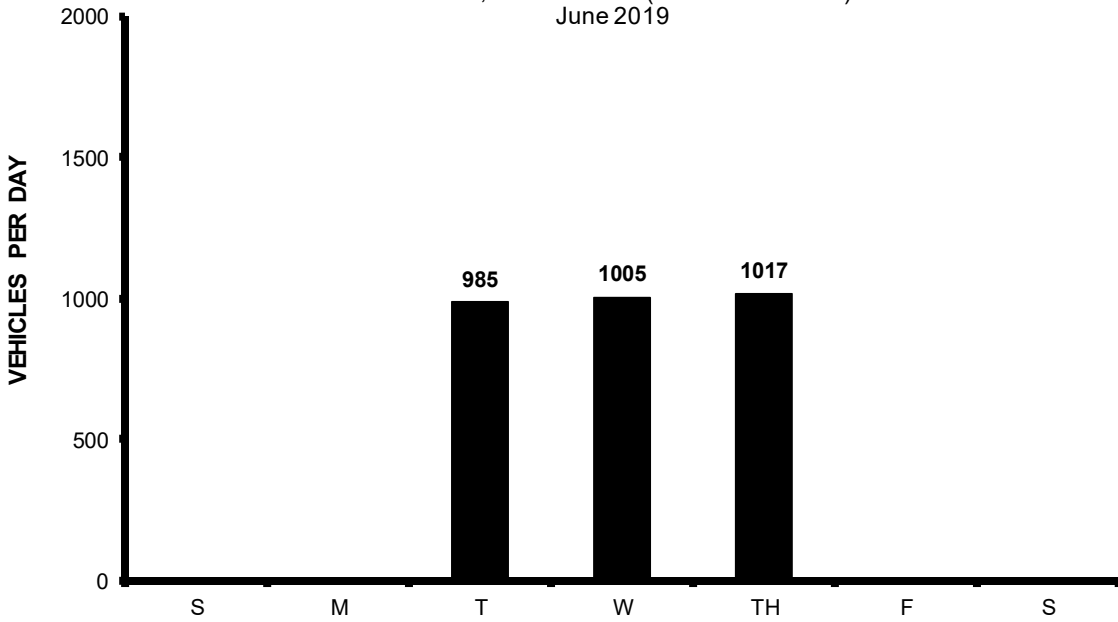
This data demonstrates that weekday traffic volumes in the area typically reach peak levels from 6:00 to 7:00 AM and from 3:00 to 4:00 PM or from 5:00 to 6:00 PM, thus corresponding to the typical commuter periods. The diagrams on Page 4 summarize the daily and hourly variations in traffic demand in June 2019 along this section of Odell Road. The detail sheet pertaining to this count is attached (see Attachment 3).

To supplement this data, Pernaw & Company, Inc., conducted an intersection turning movement and vehicle classification count on Odell Road at the Ferguson Lane intersection on Wednesday, September 2, 2020 from 7:00 to 9:00 AM and on Tuesday, September 1, 2020 from 3:00 to 6:00 PM. The highest hourly traffic volumes occurred from 7:00 to 8:00 in the morning and from 4:15 to 5:15 in the early evening (see Attachments 4 – 12).

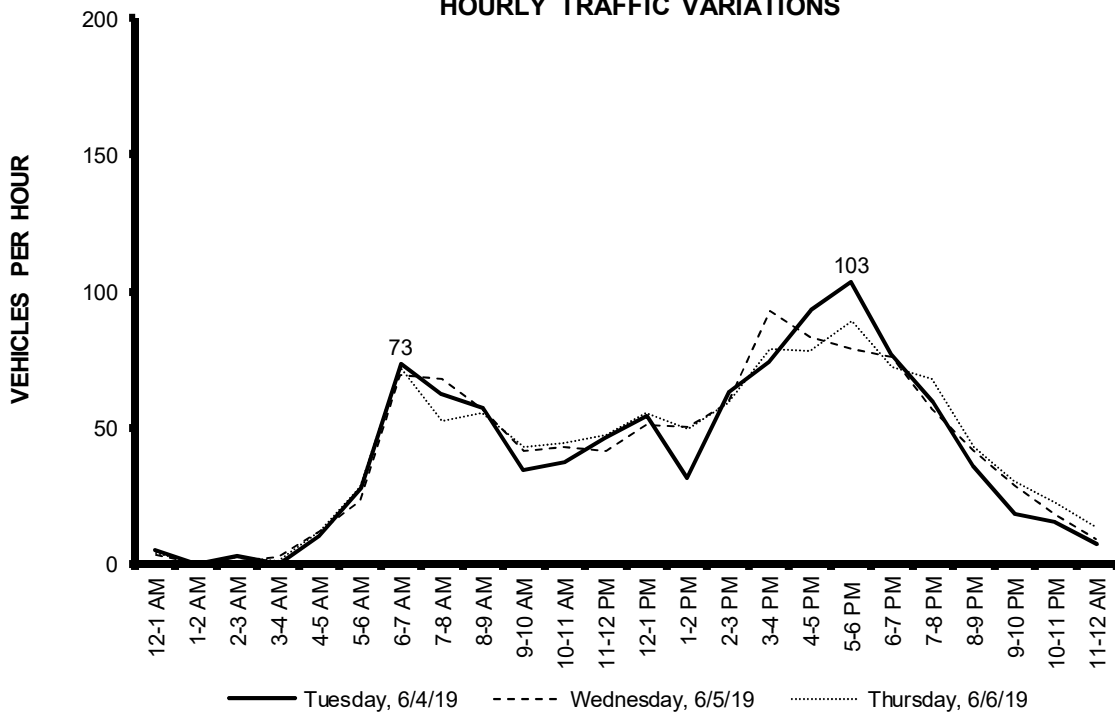
The peak hour count data for the study area intersection is summarized on Figure 2. Several facts and conclusions are evident from this data:

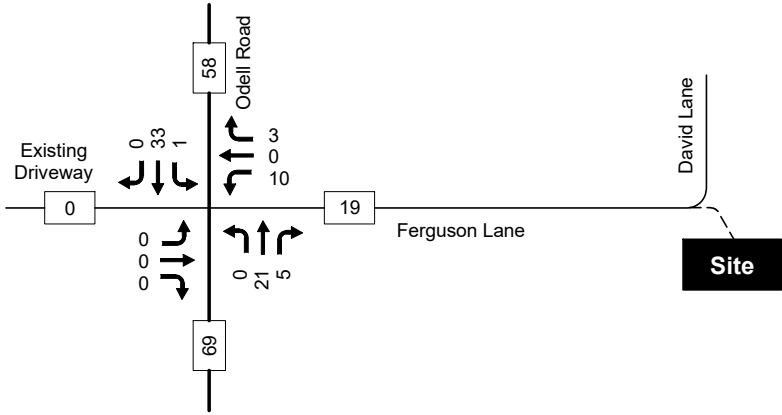
- The two-way traffic volume on Odell Road (south Ferguson Lane) totaled 69 vehicles during the weekday AM peak hour, and the higher directional traffic flow was in the southbound direction (62% SB). During the PM peak hour period, 114 vehicles utilized this section of Odell Road and the majority (58%) traveled in the northbound direction.
- Ferguson Lane (east of Odell Road) accommodated 19 vehicles (AM) and 38 vehicles (PM) during the peak hour periods. The majority turned to/from points south on Odell Road.
- Truck traffic was minimal with only 2 trucks observed during the AM and PM peak hour periods.

**DAILY TRAFFIC VARIATIONS**  
Sandown, NH - Odell Rd (Over Exeter River)  
June 2019

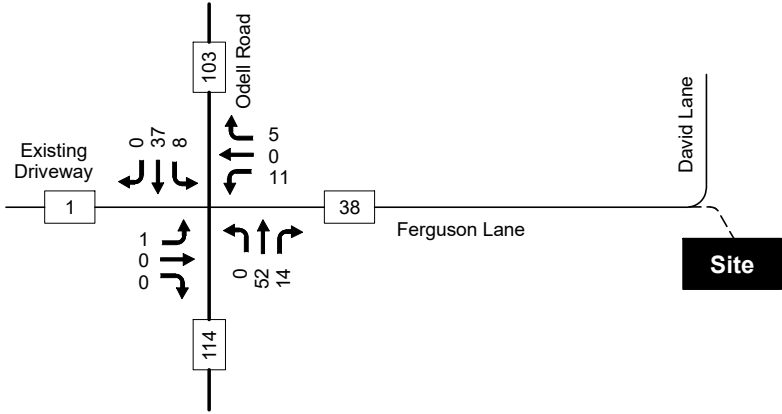


**HOURLY TRAFFIC VARIATIONS**





AM Peak Hour  
Wednesday, September 2, 2020  
7:00 to 8:00 AM



PM Peak Hour  
Tuesday, September 1, 2020  
4:15 to 5:15 PM

**Figure 2**

**2020 Existing Traffic Volumes**  
*Traffic Evaluation, Proposed Residential Development, Sandown, New Hampshire*

## TRIP GENERATION

To estimate the quantity of vehicle-trips that will be generated by the proposed residential condominiums, Pernaw & Company, Inc. considered the standard trip generation rates and equations published by the Institute of Transportation Engineers (ITE)<sup>1</sup>. Land Use Code 220 - Multifamily Housing (Low-Rise) is the most applicable category, and the number of dwelling units was used as the independent variable.

The trip estimates using the “trip rate” method and the “trip equation” method are summarized on Table 1. This analysis conservatively indicates that the proposed condominiums will generate approximately 24 vehicle-trips (6 arrivals, 18 departures) during the AM peak hour period, and approximately 31 vehicle-trips (20 arrivals, 11 departures) during the PM peak hour period, on an average weekday basis, when built out.

Table 1		Trip Generation Summary	
		Estimate A ITE Trip Rate Method <sup>1</sup>	Estimate B ITE Trip Equation Method <sup>1</sup>
Weekday Total			
	Entering	176 veh	161 veh
	Exiting	<u>176 veh</u>	<u>161 veh</u>
	Total	352 trips	322 trips
Weekday AM Peak Hour			
	Entering	5 veh	6 veh
	Exiting	<u>17 veh</u>	<u>18 veh</u>
	Total	22 trips	24 trips
Weekday PM Peak Hour			
	Entering	17 veh	20 veh
	Exiting	<u>10 veh</u>	<u>11 veh</u>
	Total	27 trips	31 trips

<sup>1</sup>ITE Land Use Code 220 - Multifamily Housing (Low-Rise) 48 Dwelling Units

All vehicle-trips associated with the proposed residential condominiums will be “primary” type trips, or new trips to the area. Attachment 13 contains the trip generation computations for the proposed residential condominiums and Attachment 14 contains diagrams that summarize the net increases in peak hour traffic flow due to the proposed development.

<sup>1</sup> Institute of Transportation Engineers, *Trip Generation*, Tenth edition (Washington, D.C., 2017).

**TRIP DISTRIBUTION**

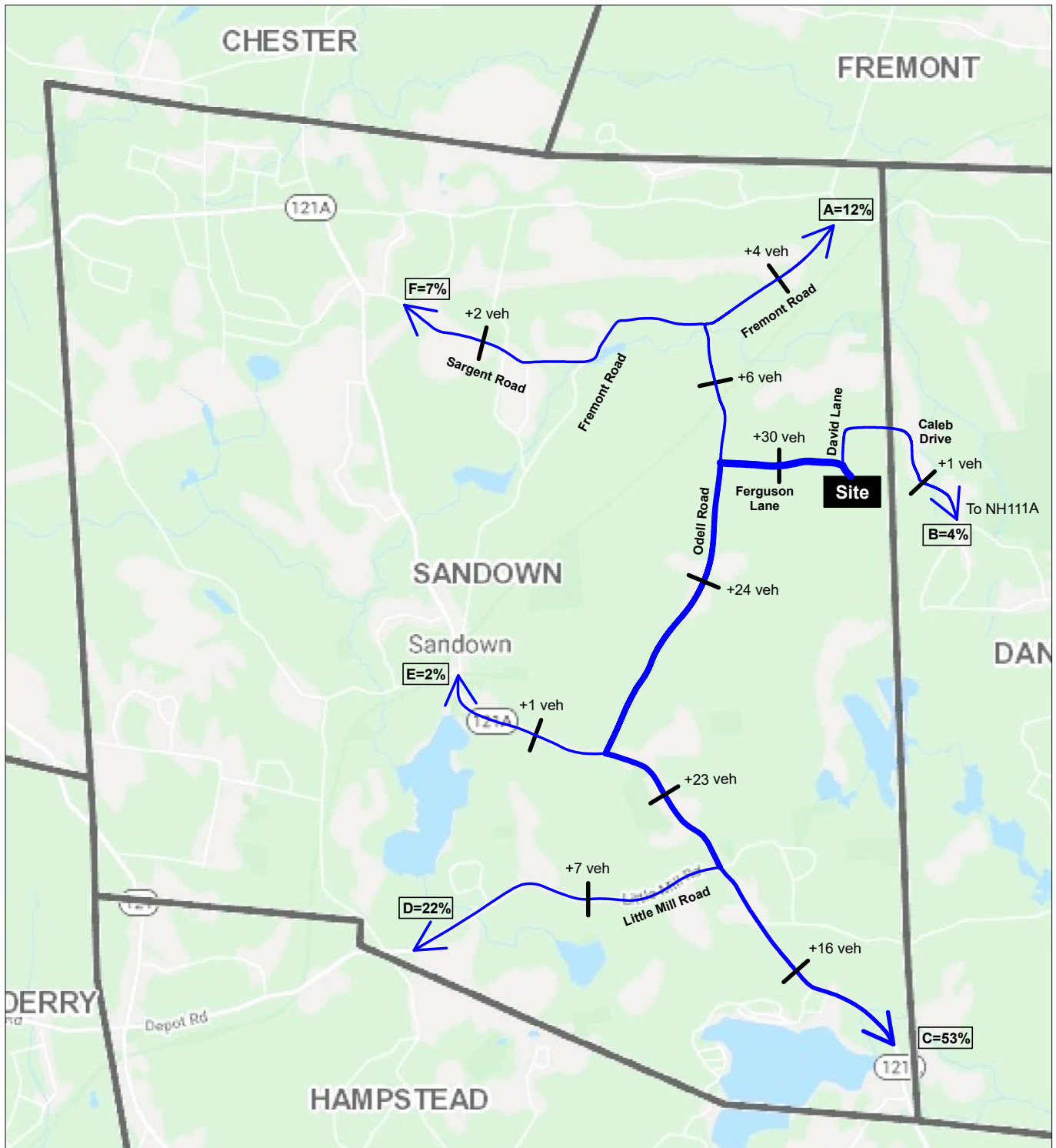
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To determine the travel patterns associated with these trip estimates, “journey to work” data from the latest census was utilized. Based on that information, as well as our familiarity of the study area, site traffic is expected to be distributed accordingly:

Trip Distribution Patterns		
Gateway	Travel Routes	Percentage
A	To / From points east via Fremont Road	12%
B	To / From points south via NH111A	4%
C	To / From points south via NH121A	53%
D	To / From points west via Little Mill Road	22%
E	To / From points north via NH121A	2%
F	To / From points west via Fremont Road	7%
		100%

The distribution of the site-generated traffic is summarized schematically on Figure 3 for the weekday PM peak hour period (see Attachment 15). This diagram shows that the net increases in hourly traffic volumes on the adjacent street system due the proposed residential condominiums ranges from +1 to +30 vehicles, depending upon location and time of day.

Ferguson Lane (west of Proposed Cole Circle) is expected to accommodate approximately +30 (PM) additional vehicles from the proposed condominiums, whereas the increase north of the site on David Lane is estimated at +1 vehicle during the PM peak hour period. The impacts on Odell Road north and south of Ferguson Lane are less and range between +6 and +24 vehicles (respectively) during the worst-case PM peak hour period.



Key

- x = Gateway, Gateway Percentage
- +yy = Site Generated Volumes - PM Peak Hour



2041A

Figure 3

Primary Travel Routes / Trip Distribution Patterns

Traffic Evaluation, Proposed Residential Development, Sandown, New Hampshire



## **FUTURE TRAFFIC VOLUMES**

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Future traffic volume estimates for the Odell Road/Ferguson Lane intersection were prepared for traffic analysis purposes. The 2031 traffic projections for the subject intersection are summarized on Figure 4. These projections are based on the existing traffic volumes (September 2020), a 1.0 percent annual background traffic growth rate (compounded annually) to account for normal growth in the area, a COVID-19 adjustment factor of 1.20, a peak-month seasonal adjustment factor of 1.05 (see Attachments 16 – 17), and the higher of the two trip generation estimates in Table 1.

## **INTERSECTION OPERATIONS**

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The Odell Road/Ferguson Lane intersection was analyzed according to the methodologies of the *Highway Capacity Manual*<sup>2</sup> as replicated by the latest edition of the *Synchro Traffic Signal Timing Software (Version 10)*, which also performs unsignalized intersection capacity analyses.

The analyses demonstrate that the departure movements from the Ferguson Lane approach to Odell Road will operate well below capacity and at Level of Service A during all hours of the day through 2031 with the proposed development fully occupied. The left-turn arrival movement from Odell Road (on to Ferguson Lane) will also operate at LOS A during all hours of the day through 2031. Attachments 18 & 19 contain the intersection capacity computations.

## **SIGHT DISTANCE**

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Providing adequate sight distance at the new intersection approach to the Ferguson Lane/David Lane intersection is an important safety consideration. The operator of a vehicle approaching an intersection should have an unobstructed view of the intersection and sufficient length of roadway to enable a full stop should it be required to avoid a collision. Similarly, exiting vehicles from Cole Circle should have sufficient visibility of approaching traffic in order to safely enter the traffic flow onto the major street.

Ample sight distance looking right and straight from the Cole Circle approach is favorable due to the horizontal and vertical alignment features found of Ferguson Lane and David Lane. Attachment 20 contains photographs looking right and straight from the proposed Cole Circle approach.

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<sup>2</sup> Transportation Research Board, *Highway Capacity Manual* (Washington, D.C., 2010).

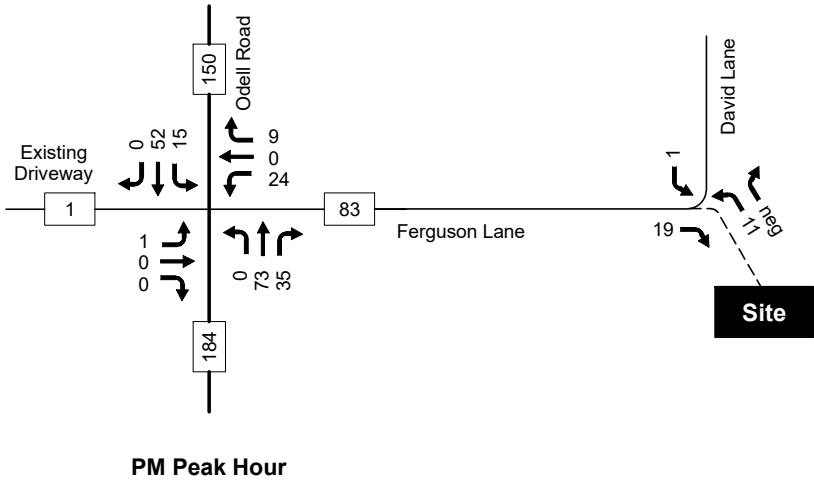
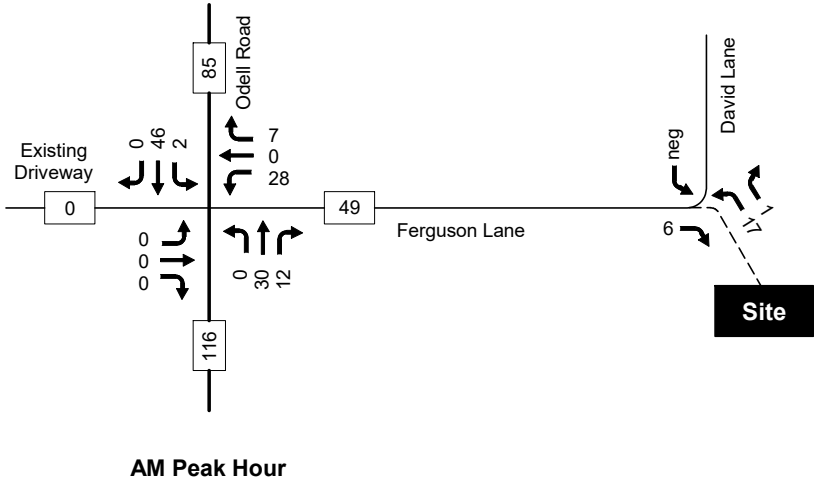


Figure 4

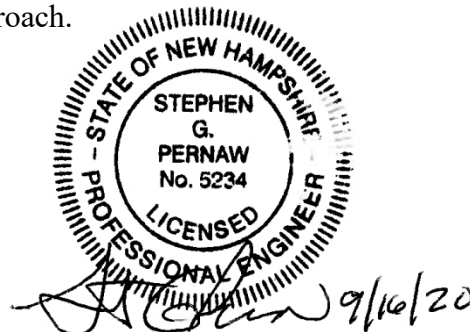
**2031 Post Development Traffic Volumes**

Traffic Evaluation, Proposed Residential Development, Sandown, New Hampshire

## FINDINGS AND CONCLUSIONS

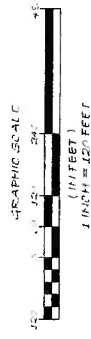
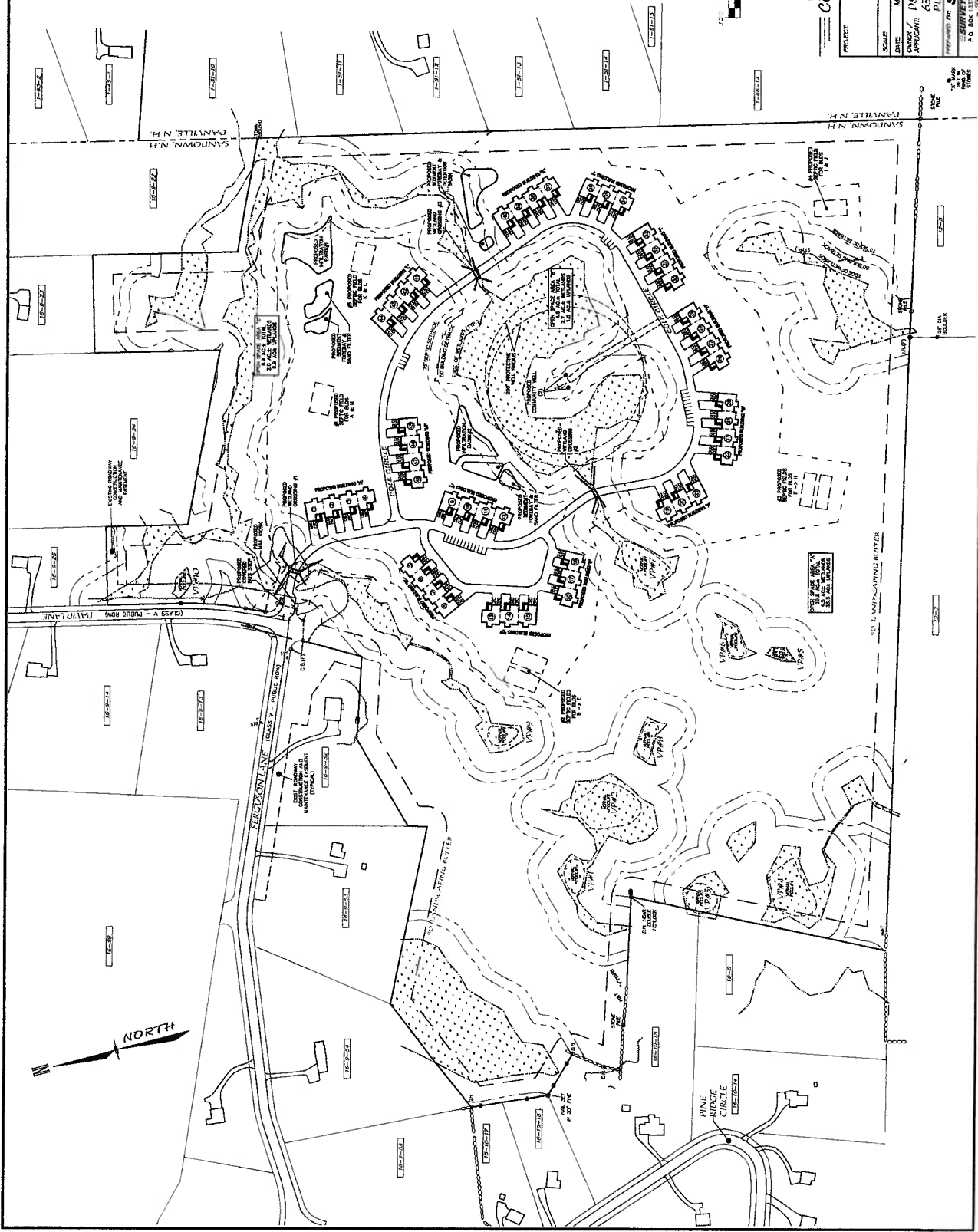
1. According to NHDOT reports, Odell Road (Over the Exeter River) carried an estimated Annual Average Daily Traffic (AADT) volume of approximately 864 vehicles per day (vpd) in 2019, down slightly from 973 vpd in 2018.
2. According to recently conducted intersection counts conducted by Pernaw & Company, Inc., the hourly traffic volumes on Odell Road at the Ferguson Lane intersection reached peak levels from 7:00 to 8:00 AM on Wednesday, September 2, 2020 with 73 vehicles entering the intersection. Similarly, on Tuesday September 1, 2020 a total of 128 vehicles were observed entering this intersection from 4:15 to 5:15 PM. Ferguson Lane accommodated 19 vehicles during the AM peak hour period and 38 vehicles during the PM peak hour period.
3. The trip generation analysis indicates that the proposed Hoytford Hills condominium development will generate approximately 24 vehicle-trips during the AM peak hour (6 arrivals, 18 departures) and 31 vehicle-trips during the PM peak hour (20 arrivals, 11 departures) when fully occupied. Most trips will be outbound during the AM peak hour, and inbound during the PM peak hour.
4. The analysis of travel patterns indicates that the majority of site traffic will utilize Ferguson Lane to travel to/from points south (77%) and north (19%) on Odell Road. The minority (4%) is expected to utilize David Lane for access/egress.
5. During the worst-case PM peak hour, Ferguson Lane is expected to carry approximately +30 vehicles, whereas David Lane will carry approximately +1 vehicle. Odell Road to the south will carry approximately +24 vehicles and Odell Road to the north will carry approximately +6 vehicles.
6. The appropriate form of traffic control at the Ferguson Lane/David Lane/Proposed Cole Circle intersection includes the installation of STOP sign control (MUTCD #R1-1) on each of the three approaches. These should be supplemented with 18-inch white stop lines and a short section of four-inch double yellow center line pavement markings to separate opposing traffic flows. Oversized stop signs (48" X 48") are recommended on the Ferguson Lane and David Lane approaches.
7. The unsignalized intersection capacity analyses for the Odell Road/Ferguson Lane intersection confirm that all applicable traffic movements will operate well below capacity and at Level of Service A during all hours of the day 2031 with the proposed development in full operation.
8. Clear sight distance triangles should be established and maintained on all approaches to the intersection. Any proposed signs or plantings, and roadside vegetation should not restrict the line of sight for drivers at the stop line on each approach.

Attachments



## **ATTACHMENTS**

NOTES:  
\* FOR ALL PROJECT NOTES SEE SHEET 1



**"HOYTFFORD HILLS"  
OPEN SPACE MULTI-FAMILY  
CONDOMINIUM DEVELOPMENT**

PROJECT:	HOYTFFORD HILLS		
OWNER:	DASH CONSTRUCTION OF PLAINSTON, INC.		
APPLICANT:	S.E.C. & ASSOCIATES, INC.		
DATE:	MARCH 24, 2020	REVISION:	1. 08-03-20
SCALE:	1" = 120'	DRAWN BY:	CAZ / JSS
SANITATION, NEW HAMPSHIRE TAX MAPING LOT 9 65 FORREST STREET RFD BOX 1337 - PLAINSTON, NH 03856 P.O. BOX 1337 - PLAINSTON, NH 03856 TEL: 603-765-1234 FAX: 603-765-1234 WWW.SECANDASSOCIATES.COM (SHEET 1, 5 & 6 TO BE RECORDED)			



Transportation Data Management System

List View All DIRs

Record	<input type="text" value="5229"/>	of 5744	Goto Record	<input type="text" value=""/>	<input type="button" value="go"/>
Location ID	82405058	MPO ID			
Type	SPOT	HPMS ID			
On NHS	No	On HPMS	No		
LRS ID	L4050061__	LRS Loc Pt.			
SF Group	04	Route Type			
AF Group	04	Route			
GF Group	E	Active	Yes		
Class Dist Grp	Default	Category	3		
Seas Class Grp	Default				
WIM Group	Default				
QC Group	Default				
Funct'l Class	Local	Milepost			
Located On	Odell Rd				
Loc On Alias	ODELL RD OVER EXETER RIVER				
More Detail					
STATION DATA					

Directions:

AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2019	864	103	12	54	791 (92%)	73 (8%)	
2018	973 <sup>3</sup>		13		896 (92%)	77 (8%)	Grown from 2017
2017	954 <sup>3</sup>		13		884 (93%)	70 (7%)	Grown from 2016
2016	935	122	13		852 (91%)	83 (9%)	
2015	873 <sup>3</sup>						Grown from 2014

1-5 of 13

Travel Demand Model										
Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV	

VOLUME COUNT			
	Date	Int	Total
	Thu 6/6/2019	60	1,017
	Wed 6/5/2019	60	1,005
	Tue 6/4/2019	60	985
	Wed 4/27/2016	60	1,053
	Tue 4/26/2016	60	881
	Mon 4/25/2016	60	904
	Fri 8/30/2013	60	981

VOLUME TREND	
Year	Annual Growth
2019	-11%
2018	2%
2017	2%
2016	7%
2015	3%
2014	2%
2013	2%



Transportation Data Management System



Excel Version

Weekly Volume Report		
<b>Location ID:</b>	82405058	<b>Type:</b> SPOT
<b>Located On:</b>	Odell Rd	:
<b>Direction:</b>	2-WAY	
<b>Community:</b>	SANDOWN	<b>Period:</b> Mon 6/3/2019 - Sun 6/9/2019
<b>AADT:</b>	864	

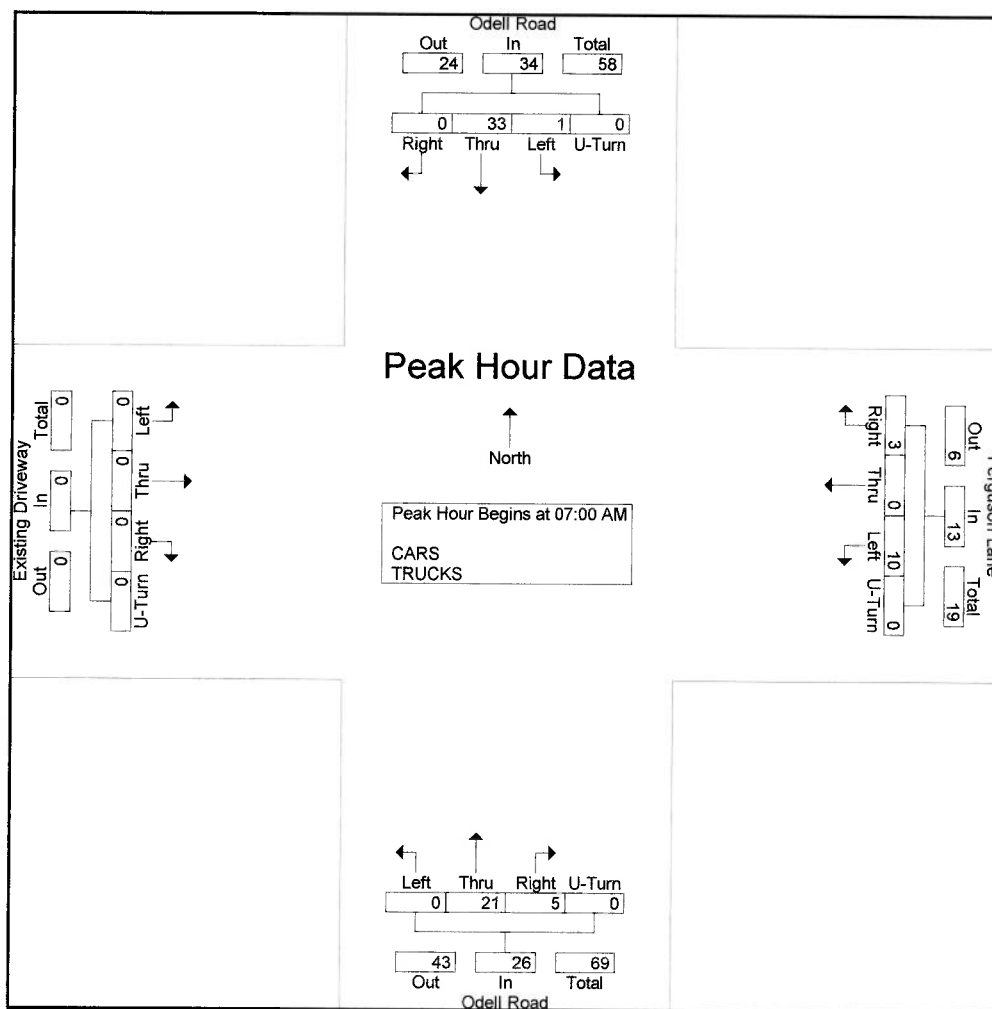
Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg	Graph
12:00 AM		5	3	4				4	0.4%
1:00 AM		0	0	0				0	0.0%
2:00 AM		3	1	2				2	0.2%
3:00 AM		0	2	1				1	0.1%
4:00 AM		10	12	12				11	1.1%
5:00 AM		28	23	28				26	2.6%
6:00 AM		73	69	72				71	7.1%
7:00 AM		62	68	52				61	6.1%
8:00 AM		57	57	55				56	5.6%
9:00 AM		34	41	43				39	3.9%
10:00 AM		37	43	44				41	4.1%
11:00 AM		46	41	47				45	4.5%
12:00 PM		54	51	55				53	5.3%
1:00 PM		31	50	49				43	4.3%
2:00 PM		63	59	59				60	6.0%
3:00 PM		74	93	79				82	8.2%
4:00 PM		93	83	78				85	8.4%
5:00 PM		103	79	89				90	9.0%
6:00 PM		77	76	72				75	7.5%
7:00 PM		59	57	68				61	6.1%
8:00 PM		36	41	43				40	4.0%
9:00 PM		18	29	30				26	2.6%
10:00 PM		15	18	22				18	1.8%
11:00 PM		7	9	13				10	1.0%
<b>Total</b>	<b>0</b>	<b>985</b>	<b>1,005</b>	<b>1,017</b>	<b>0</b>	<b>0</b>	<b>0</b>		
<b>24hr Total</b>		985	1005	1017				1,002	
<b>AM Pk Hr</b>		6:00	6:00	6:00					
<b>AM Peak</b>		73	69	72				71	
<b>PM Pk Hr</b>		5:00	3:00	5:00					
<b>PM Peak</b>		103	93	89				95	
<b>% Pk Hr</b>		10.46%	9.25%	8.75%				9.49%	

Stephen G. Pernav & Company, Inc.  
P.O. Box 1721  
Concord, New Hampshire 03302

Weather: Clear  
Collected By: MV  
Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_AM  
Site Code : 2041A  
Start Date : 9/2/2020  
Page No : 2

Start Time	Odell Road From North					Ferguson Lane From East					Odell Road From South					Existing Driveway From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	13	1	0	14	0	0	2	0	2	0	2	0	0	2	0	0	0	0	0	18
07:15 AM	0	8	0	0	8	1	0	1	0	2	2	6	0	0	8	0	0	0	0	0	18
07:30 AM	0	6	0	0	6	2	0	5	0	7	0	4	0	0	4	0	0	0	0	0	17
07:45 AM	0	6	0	0	6	0	0	2	0	2	3	9	0	0	12	0	0	0	0	0	20
Total Volume	0	33	1	0	34	3	0	10	0	13	5	21	0	0	26	0	0	0	0	0	73
% App. Total	0	97.1	2.9	0		23.1	0	76.9	0		19.2	80.8	0	0		0	0	0	0		
PHF	.000	.635	.250	.000	.607	.375	.000	.500	.000	.464	.417	.583	.000	.000	.542	.000	.000	.000	.000	.000	.913



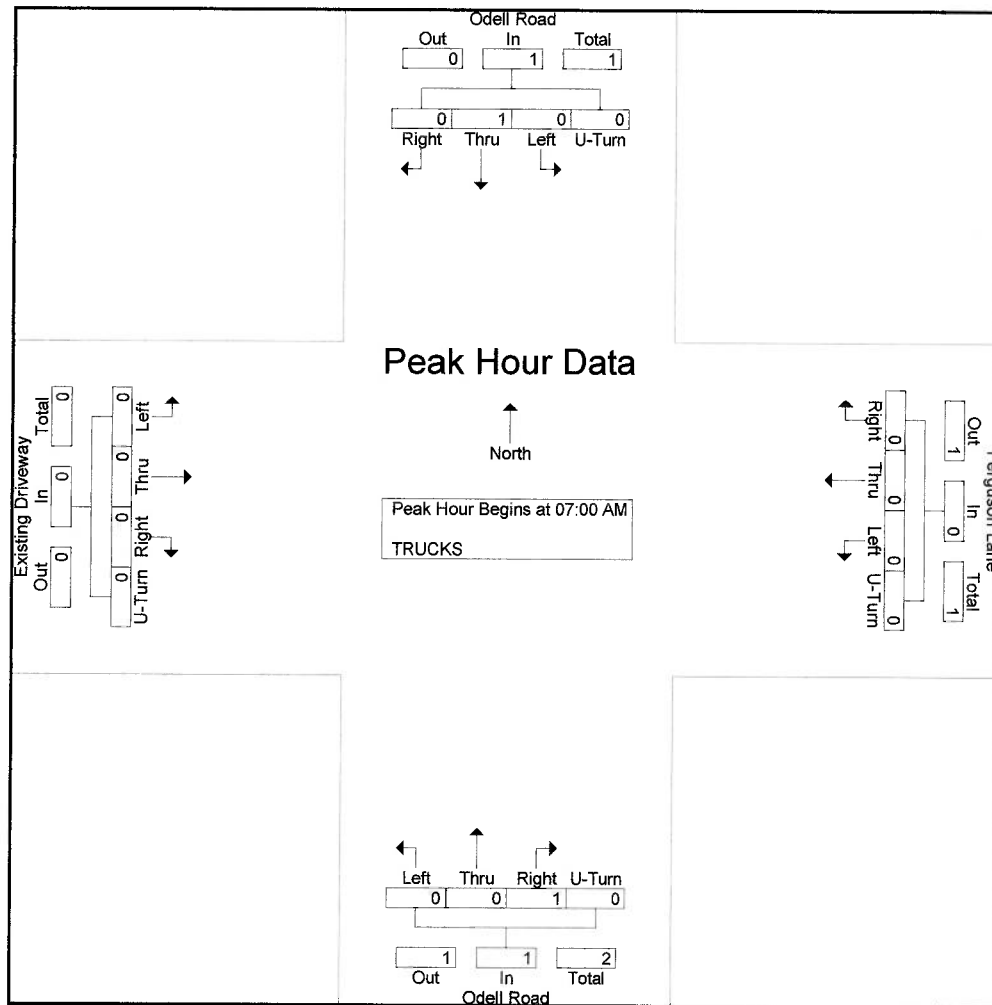


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Weather: Clear  
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Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_AM  
Site Code : 2041A  
Start Date : 9/2/2020  
Page No : 2

Start Time	Odell Road From North					Ferguson Lane From East					Odell Road From South					Existing Driveway From West					Int. Total
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Total Volume	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
% App. Total	0	100	0	0		0	0	0	0		100	0	0	0		0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.000	.000	.000	.000	.000	.500



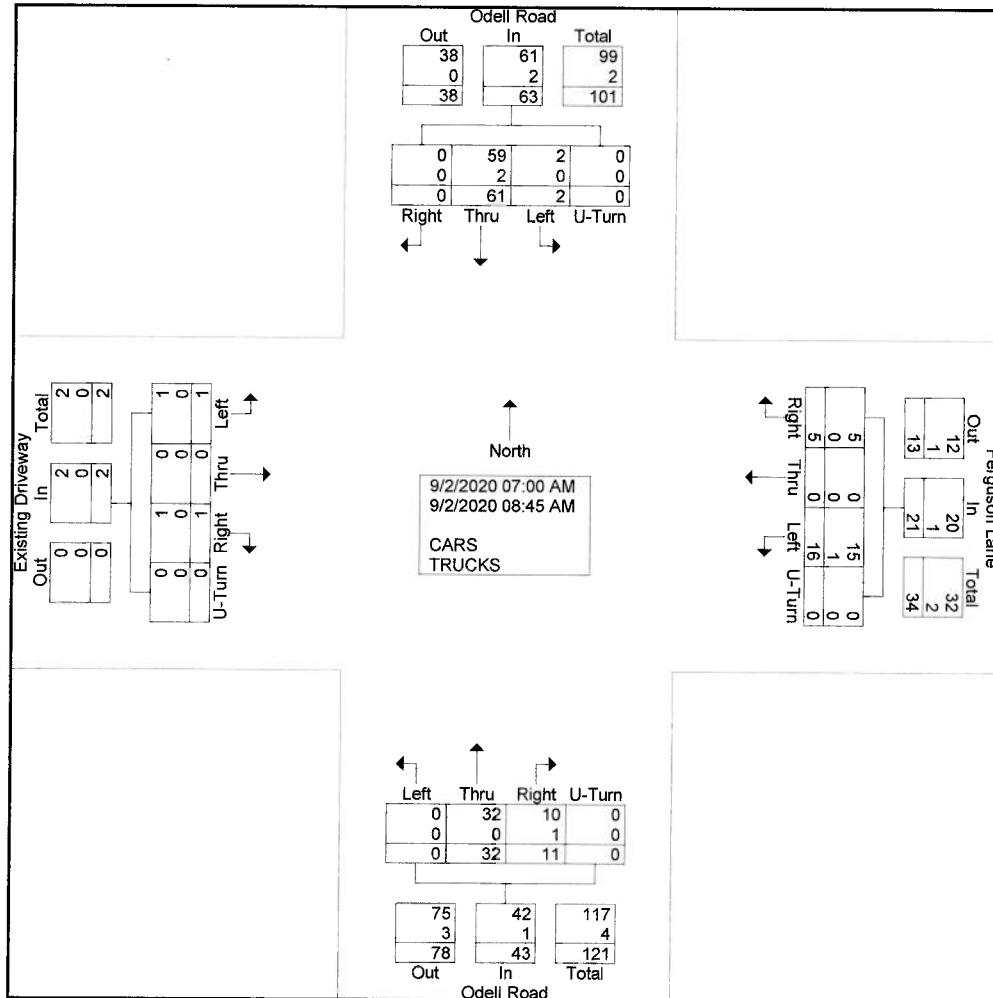
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Weather: Clear  
Collected By: MV  
Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_AM  
Site Code : 2041A  
Start Date : 9/2/2020  
Page No : 1

Groups Printed- CARS - TRUCKS

Start Time	Odell Road From North					Ferguson Lane From East					Odell Road From South					Existing Driveway From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
07:00 AM	0	13	1	0	14	0	0	2	0	2	0	2	0	0	2	0	0	0	0	0	18
07:15 AM	0	8	0	0	8	1	0	1	0	2	2	6	0	0	8	0	0	0	0	0	18
07:30 AM	0	6	0	0	6	2	0	5	0	7	0	4	0	0	4	0	0	0	0	0	17
07:45 AM	0	6	0	0	6	0	0	2	0	2	3	9	0	0	12	0	0	0	0	0	20
Total	0	33	1	0	34	3	0	10	0	13	5	21	0	0	26	0	0	0	0	0	73
08:00 AM	0	6	1	0	7	1	0	2	0	3	2	1	0	0	3	1	0	1	0	2	15
08:15 AM	0	9	0	0	9	1	0	2	0	3	1	3	0	0	4	0	0	0	0	0	16
08:30 AM	0	9	0	0	9	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	12
08:45 AM	0	4	0	0	4	0	0	2	0	2	2	5	0	0	7	0	0	0	0	0	13
Total	0	28	1	0	29	2	0	6	0	8	6	11	0	0	17	1	0	1	0	2	56
Grand Total	0	61	2	0	63	5	0	16	0	21	11	32	0	0	43	1	0	1	0	2	129
Apprch %	0	96.8	3.2	0		23.8	0	76.2	0		25.6	74.4	0	0		50	0	50	0		
Total %	0	47.3	1.6	0	48.8	3.9	0	12.4	0	16.3	8.5	24.8	0	0	33.3	0.8	0	0.8	0	1.6	
CARS	0	59	2	0	61	5	0	15	0	20	10	32	0	0	42	1	0	1	0	2	125
% CARS	0	96.7	100	0	96.8	100	0	93.8	0	95.2	90.9	100	0	0	97.7	100	0	100	0	100	96.9
TRUCKS	0	2	0	0	2	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	4
% TRUCKS	0	3.3	0	0	3.2	0	0	6.2	0	4.8	9.1	0	0	0	2.3	0	0	0	0	0	3.1



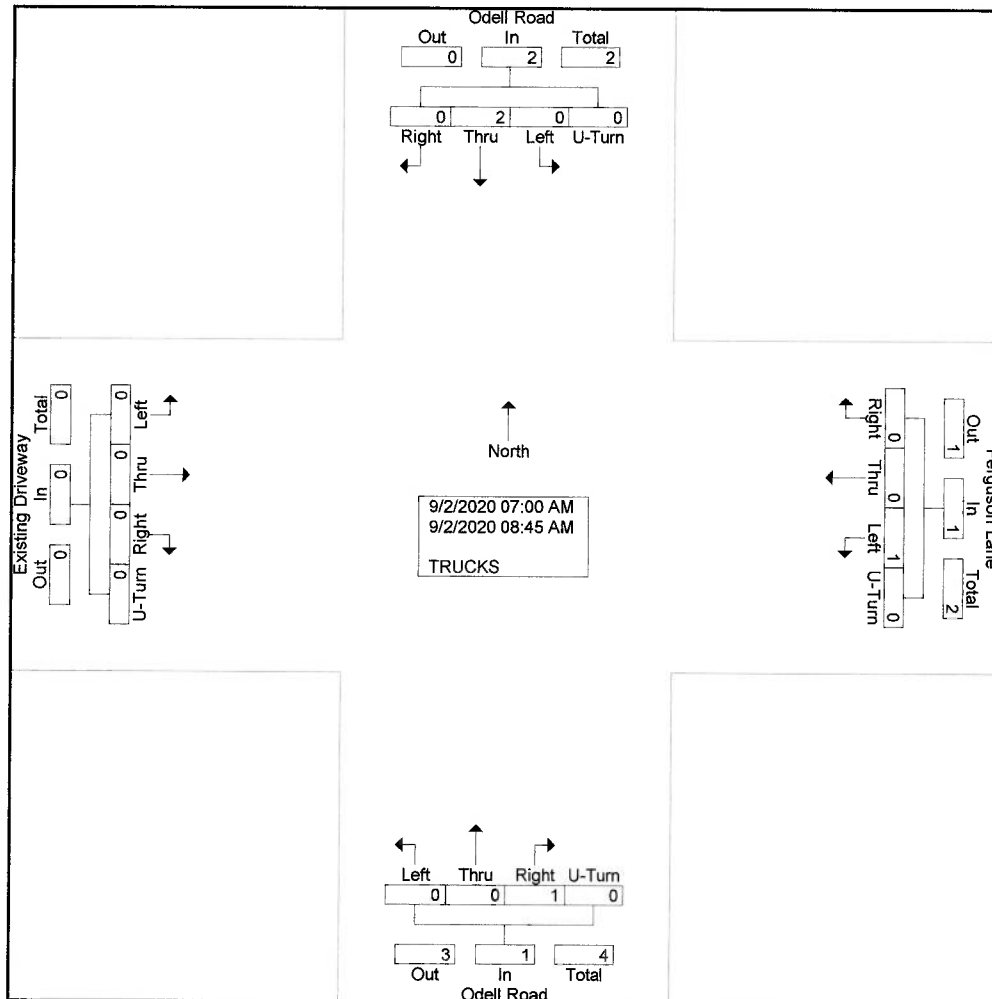
Stephen G. Perna & Company, Inc.  
P.O. Box 1721  
Concord, New Hampshire 03302

Weather: Clear  
Collected By: MV  
Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_AM  
Site Code : 2041A  
Start Date : 9/2/2020  
Page No : 1

Groups Printed- TRUCKS

Start Time	Odell Road From North					Ferguson Lane From East					Odell Road From South					Existing Driveway From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
07:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	2	0	0	2	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0
Apprch %	0	100	0	0		0	0	100	0		100	0	0	0		0	0	0	0		
Total %	0	50	0	0	50	0	0	25	0	25	25	0	0	0	25	0	0	0	0	0	

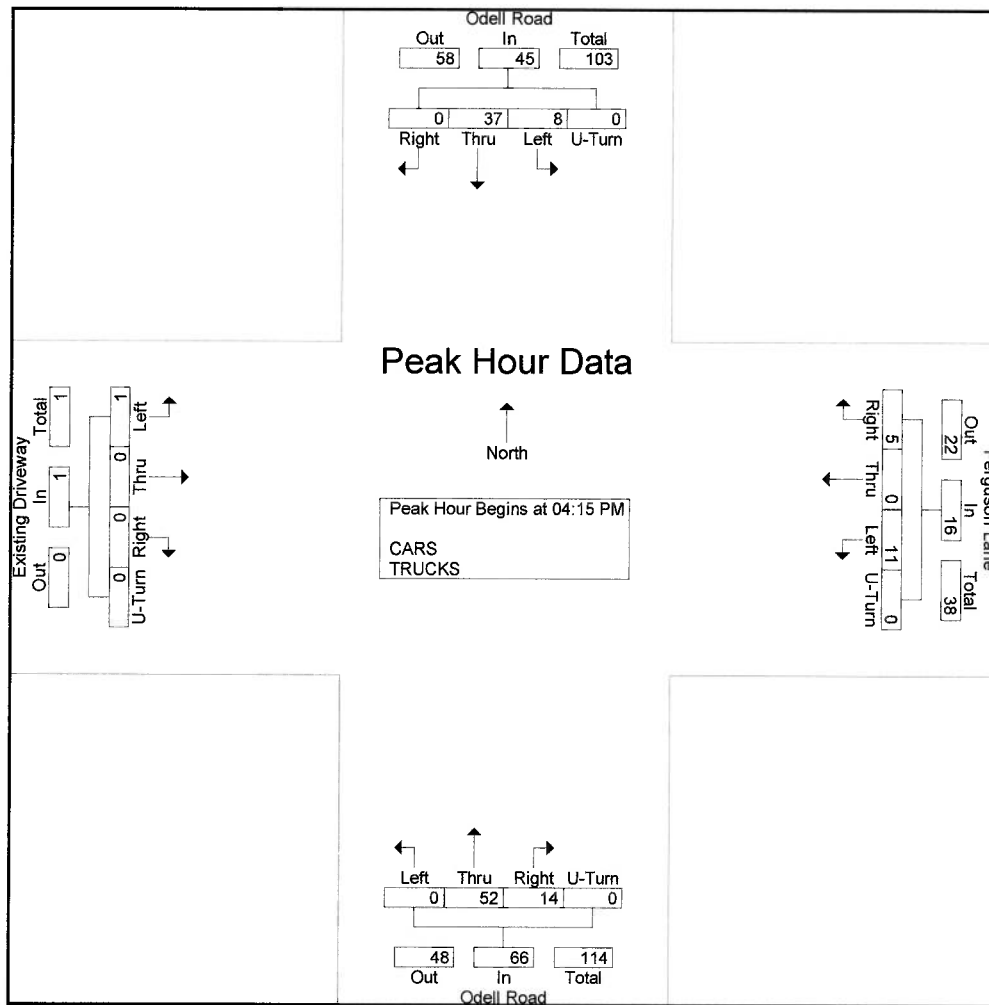


Stephen G. Perna & Company, Inc.  
P.O. Box 1721  
Concord, New Hampshire 03302

Weather: Clear  
Collected By: MV  
Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_PM  
Site Code : 2041A  
Start Date : 9/1/2020  
Page No : 3

Start Time	Odell Road From North					Ferguson Lane From East					Odell Road From South					Existing Driveway From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	12	1	0	13	2	0	3	0	5	4	12	0	0	16	0	0	1	0	1	35
04:30 PM	0	9	3	0	12	2	0	3	0	5	2	12	0	0	14	0	0	0	0	0	31
04:45 PM	0	6	1	0	7	1	0	1	0	2	5	13	0	0	18	0	0	0	0	0	27
05:00 PM	0	10	3	0	13	0	0	4	0	4	3	15	0	0	18	0	0	0	0	0	35
Total Volume	0	37	8	0	45	5	0	11	0	16	14	52	0	0	66	0	0	1	0	1	128
% App. Total	0	82.2	17.8	0		31.2	0	68.8	0		21.2	78.8	0	0		0	0	100	0		
PHF	.000	.771	.667	.000	.865	.625	.000	.688	.000	.800	.700	.867	.000	.000	.917	.000	.000	.250	.000	.250	.914

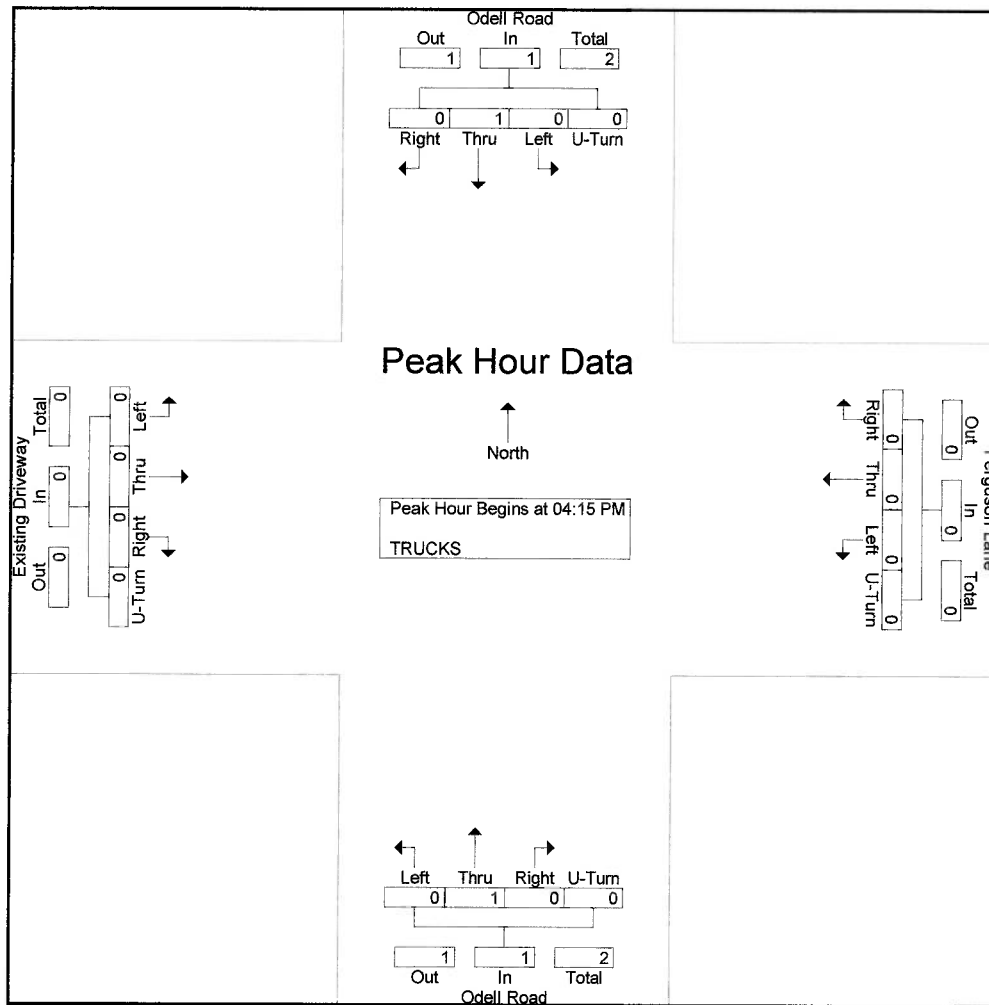


Stephen G. Perna & Company, Inc.  
P.O. Box 1721  
Concord, New Hampshire 03302

Weather: Clear  
Collected By: MV  
Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_PM  
Site Code : 2041A  
Start Date : 9/1/2020  
Page No : 2

Start Time	Odell Road From North				Ferguson Lane From East				Odell Road From South				Existing Driveway From West				Int. Total					
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right		Thru	Left	U-Turn	App Total	
Peak Hour Analysis From 04:15 PM to 05:00 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 04:15 PM																						
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.500



Stephen G. Perna & Company, Inc.  
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Weather: Clear  
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Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_PM  
Site Code : 2041A  
Start Date : 9/1/2020  
Page No : 1

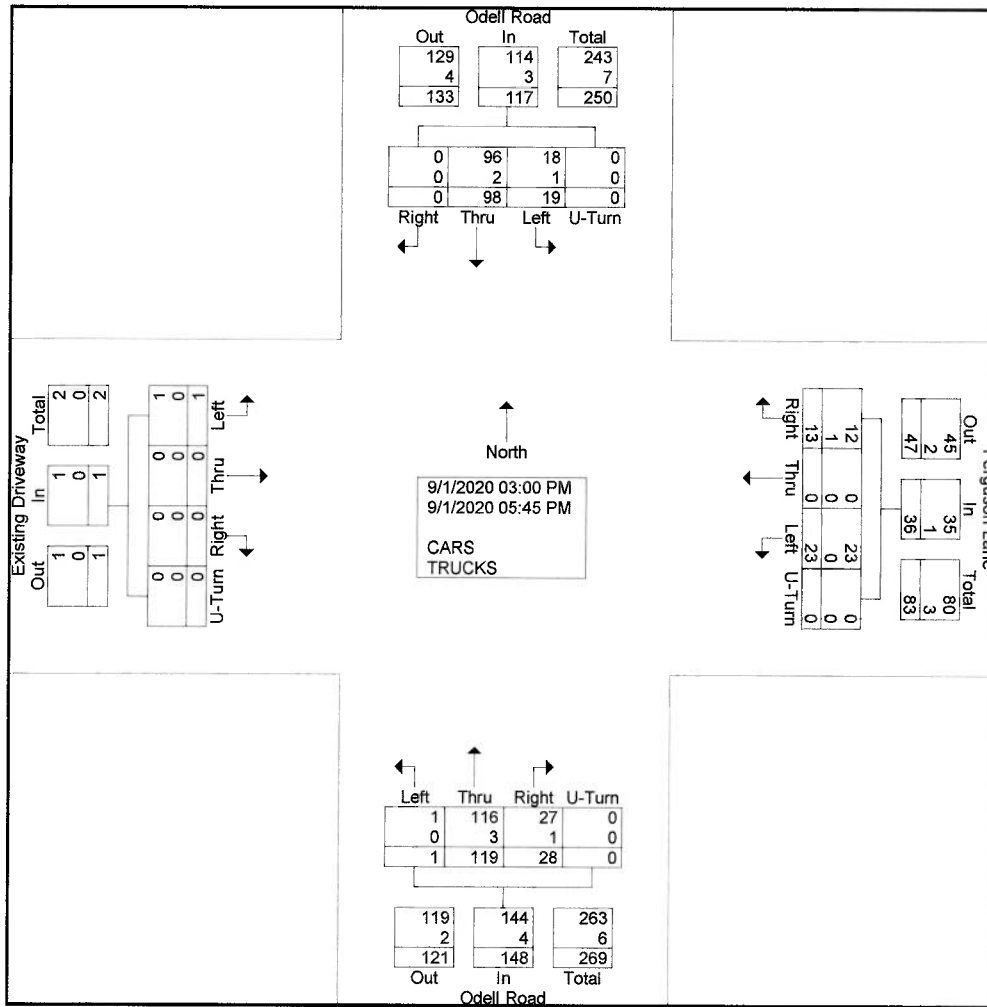
Groups Printed- CARS - TRUCKS

Start Time	Odell Road From North					Ferguson Lane From East					Odell Road From South					Existing Driveway From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
03:00 PM	0	2	0	0	2	2	0	1	0	3	1	8	1	0	10	0	0	0	0	0	15
03:15 PM	0	7	3	0	10	2	0	0	0	2	1	6	0	0	7	0	0	0	0	0	19
03:30 PM	0	9	1	0	10	1	0	4	0	5	1	2	0	0	3	0	0	0	0	0	18
03:45 PM	0	7	0	0	7	2	0	1	0	3	1	6	0	0	7	0	0	0	0	0	17
<b>Total</b>	<b>0</b>	<b>25</b>	<b>4</b>	<b>0</b>	<b>29</b>	<b>7</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>13</b>	<b>4</b>	<b>22</b>	<b>1</b>	<b>0</b>	<b>27</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>69</b>
04:00 PM	0	14	5	0	19	0	0	0	0	0	3	4	0	0	7	0	0	0	0	0	26
04:15 PM	0	12	1	0	13	2	0	3	0	5	4	12	0	0	16	0	0	1	0	1	35
04:30 PM	0	9	3	0	12	2	0	3	0	5	2	12	0	0	14	0	0	0	0	0	31
04:45 PM	0	6	1	0	7	1	0	1	0	2	5	13	0	0	18	0	0	0	0	0	27
<b>Total</b>	<b>0</b>	<b>41</b>	<b>10</b>	<b>0</b>	<b>51</b>	<b>5</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>12</b>	<b>14</b>	<b>41</b>	<b>0</b>	<b>0</b>	<b>55</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>119</b>
05:00 PM	0	10	3	0	13	0	0	4	0	4	3	15	0	0	18	0	0	0	0	0	35
05:15 PM	0	4	0	0	4	1	0	2	0	3	2	12	0	0	14	0	0	0	0	0	21
05:30 PM	0	9	1	0	10	0	0	2	0	2	3	14	0	0	17	0	0	0	0	0	29
05:45 PM	0	9	1	0	10	0	0	2	0	2	2	15	0	0	17	0	0	0	0	0	29
<b>Total</b>	<b>0</b>	<b>32</b>	<b>5</b>	<b>0</b>	<b>37</b>	<b>1</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>11</b>	<b>10</b>	<b>56</b>	<b>0</b>	<b>0</b>	<b>66</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>114</b>
<b>Grand Total</b>	<b>0</b>	<b>98</b>	<b>19</b>	<b>0</b>	<b>117</b>	<b>13</b>	<b>0</b>	<b>23</b>	<b>0</b>	<b>36</b>	<b>28</b>	<b>119</b>	<b>1</b>	<b>0</b>	<b>148</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>302</b>
<b>Apprch %</b>	<b>0</b>	<b>83.8</b>	<b>16.2</b>	<b>0</b>		<b>36.1</b>	<b>0</b>	<b>63.9</b>	<b>0</b>		<b>18.9</b>	<b>80.4</b>	<b>0.7</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>		
<b>Total %</b>	<b>0</b>	<b>32.5</b>	<b>6.3</b>	<b>0</b>	<b>38.7</b>	<b>4.3</b>	<b>0</b>	<b>7.6</b>	<b>0</b>	<b>11.9</b>	<b>9.3</b>	<b>39.4</b>	<b>0.3</b>	<b>0</b>	<b>49</b>	<b>0</b>	<b>0</b>	<b>0.3</b>	<b>0</b>	<b>0.3</b>	
<b>CARS</b>	<b>0</b>	<b>96</b>	<b>18</b>	<b>0</b>	<b>114</b>	<b>12</b>	<b>0</b>	<b>23</b>	<b>0</b>	<b>35</b>	<b>27</b>	<b>116</b>	<b>1</b>	<b>0</b>	<b>144</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>294</b>
<b>% CARS</b>	<b>0</b>	<b>98</b>	<b>94.7</b>	<b>0</b>	<b>97.4</b>	<b>92.3</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>97.2</b>	<b>96.4</b>	<b>97.5</b>	<b>100</b>	<b>0</b>	<b>97.3</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>97.4</b>
<b>TRUCKS</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>
<b>% TRUCKS</b>	<b>0</b>	<b>2</b>	<b>5.3</b>	<b>0</b>	<b>2.6</b>	<b>7.7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2.8</b>	<b>3.6</b>	<b>2.5</b>	<b>0</b>	<b>0</b>	<b>2.7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2.6</b>

Stephen G. Perna & Company, Inc.  
P.O. Box 1721  
Concord, New Hampshire 03302

Weather: Clear  
Collected By: MV  
Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_PM  
Site Code : 2041A  
Start Date : 9/1/2020  
Page No : 2



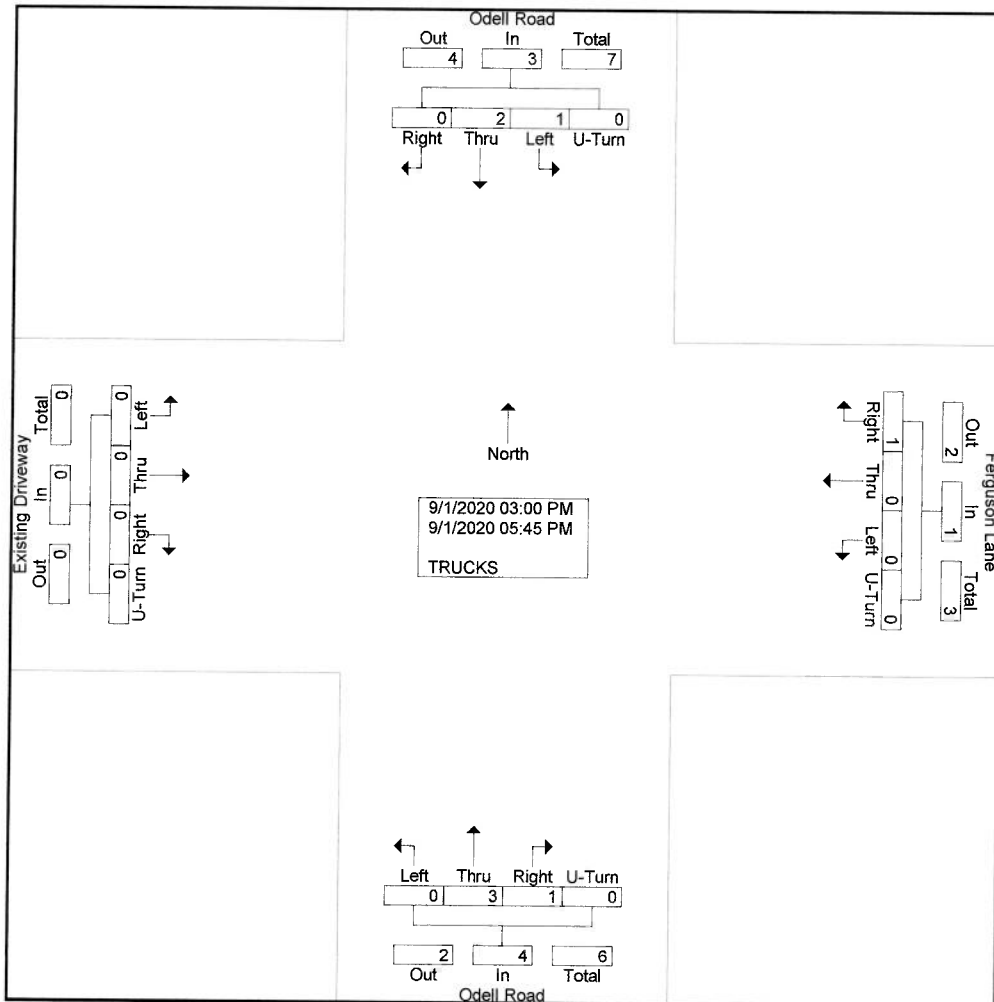
Stephen G. Perna & Company, Inc.  
P.O. Box 1721  
Concord, New Hampshire 03302

Weather: Clear  
Collected By: MV  
Job Number: 2041A  
Town/State: Sandown, NH

File Name : 2041A\_INT\_A\_\_PM  
Site Code : 2041A  
Start Date : 9/1/2020  
Page No : 1

Groups Printed- TRUCKS

Start Time	Odell Road From North					Ferguson Lane From East					Odell Road From South					Existing Driveway From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0
04:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	1	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0
Grand Total	0	2	1	0	3	1	0	0	0	1	1	3	0	0	4	0	0	0	0	0	8
Apprch %	0	66.7	33.3	0		100	0	0	0		25	75	0	0		0	0	0	0		
Total %	0	25	12.5	0	37.5	12.5	0	0	0	12.5	12.5	37.5	0	0	50	0	0	0	0	0	





### Trip Generation Summary

Alternative: Alternative 1

Phase:

Project: 2041A Gen

Open Date: 8/31/2020

Analysis Date: 8/31/2020

ITE	Land Use	Weekday Average Daily Trips			Weekday AM Peak Hour of Adjacent Street Traffic			Weekday PM Peak Hour of Adjacent Street Traffic		
		* Enter	Exit	Total	* Enter	Exit	Total	* Enter	Exit	Total
220	LOW-RISE 2 <i>EQUATION METHOD</i> 48 Dwelling Units	161	161	322	6	18	24	20	11	31
220	LOW-RISE 1 <i>RATE METHOD</i> 48 Dwelling Units	176	175	351	5	17	22	17	10	27
	Unadjusted Volume	<del>337</del>	<del>336</del>	<del>673</del>	<del>11</del>	<del>35</del>	<del>46</del>	<del>37</del>	<del>21</del>	<del>58</del>
	Internal Capture Trips	0	0	0	0	0	0	0	0	0
	Pass-By Trips	0	0	0	0	0	0	0	0	0
	Volume Added to Adjacent Streets	<del>337</del>	<del>336</del>	<del>673</del>	<del>11</del>	<del>35</del>	<del>46</del>	<del>37</del>	<del>21</del>	<del>58</del>

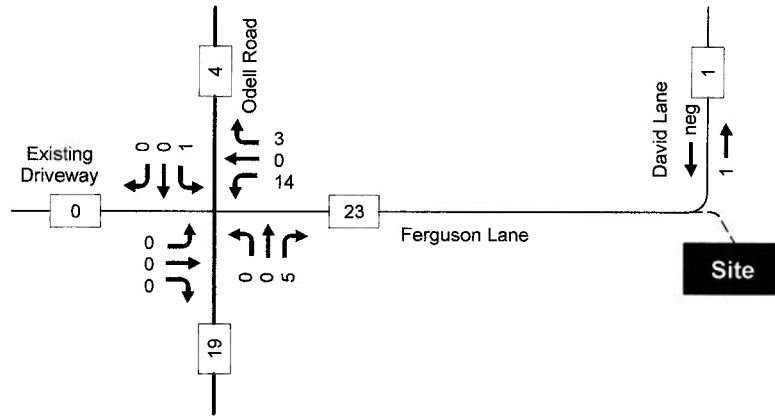
Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

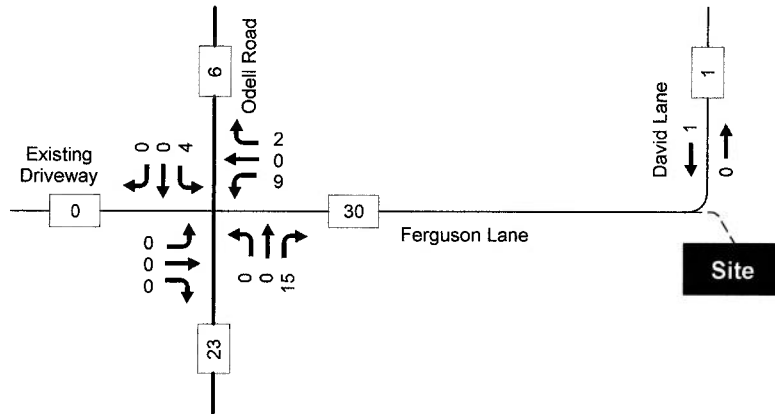
Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

\* - Custom rate used for selected time period.

**Pernaw & Company, Inc**

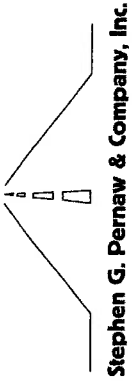


**AM Peak Hour**



**PM Peak Hour**





Location: Sandown, New Hampshire  
 Job Number: 2041A

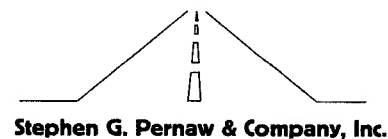
## TRIP DISTRIBUTION ANALYSIS

### Work Destination Report - Where Workers are Employed Who Live in the Selection Area - by County Subdivisions

Total All Jobs	Count	Gateway %						Gateway Allocation																
		A1	A2	A3	B	C	D	E	F	A1	A2	A3	B	C	D	E	F							
Salem town (Rockingham, NH)	255				0.10	0.90							0.40	1.00	0	0	26	230	0	0	0	0	0	256
Plaistow town (Rockingham, NH)	249				0.10	0.90								1.00	0	0	25	224	0	0	0	0	0	249
Manchester city (Hillsborough, NH)	234	0.40					0.20	0.40						1.00	94	0	0	0	0	0	0	0	94	235
Hampstead town (Rockingham, NH)	163					0.50	0.50							1.00	0	0	0	82	82	0	0	0	0	164
Haverhill city (Essex, MA)	148					1.00								1.00	0	0	0	148	0	0	0	0	0	148
Derry town (Rockingham, NH)	138						1.00							1.00	0	0	0	0	138	0	0	0	0	138
Nashua city (Hillsborough, NH)	135					0.50	0.50							1.00	0	0	0	68	68	0	0	0	0	136
Sandown town (Rockingham, NH)	122	0.02	0.02	0.01		0.25	0.25	0.20						1.00	2	2	1	31	31	31	24	24	24	122
Andover town (Essex, MA)	112					1.00								1.00	0	0	0	112	0	0	0	0	0	112
Portsmouth city (Rockingham, NH)	112	0.90			0.10									1.00	101	0	0	11	0	0	0	0	0	112
<b>Total</b>	<b>1668</b>													<b>197</b>	<b>2</b>	<b>1</b>	<b>62</b>	<b>895</b>	<b>366</b>	<b>31</b>	<b>118</b>	<b>1672</b>	<b>100%</b>	

Rounded		PM Trips		AM Trips	
12	0	4	1	3	1
22	0	7	1	5	neg
53	2	16	7	13	2
22	2	7	1	5	2
7	7.1%	2	1.9%	2	7.1%

- Gateways**
- A1 = Fremont Road East
  - A2 = Fremont Road East
  - A3 = Fremont Road East
  - B = NH111A South
  - C = NH121A South
  - D = Little Mill Road West
  - E = NH121A North
  - F = Fremont Road West



STEPHEN G. PERNAW & COMPANY, INC.  
 PROJECT: Proposed Residential Development, Sandown, New Hampshire  
 NUMBER: 2041A  
 COUNT STATION: 82405058

### HISTORICAL GROWTH CALCULATIONS

LOCATION : Odell Road (Over Exeter River) - Sandown, NH  
 CASE : AADT

### ARITHMETIC PROJECTIONS

YEAR	AADT	Regression Output:		PROJECTIONS	
2015	873	Constant	-3114.2	2020	926
2016	935	Std Err of Y Est	56.25774	2021	928
2017	954	R Squared	0.0041952	2022	930
2018	973	No. of Observations	5	2023	932
2019	864	Degrees of Freedom	3	2024	934
		X Coefficient	2	2025	936
		Std Err of Coef.	17.79026	2026	938
				2027	940
				2028	942
				2029	944
				2030	946

RATE = 2 VPD/YEAR

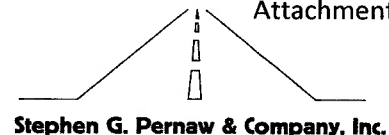
### GEOMETRIC PROJECTIONS

YEAR	AADT	Ln AADT	Regression Output:		PROJECTIONS	
2015	873	6.77194	Constant	2.96813	2020	924
2016	935	6.84055	Std Err of Y Est	0.061546	2021	926
2017	954	6.86066	R Squared	0.003204	2022	928
2018	973	6.88038	No. of Observations	5	2023	929
2019	864	6.76157	Degrees of Freedom	3	2024	931
			X Coefficient	0.0019112	2025	933
			Std Err of Coef.	0.0194625	2026	935
					2027	936
					2028	938
					2029	940
					2030	942

RATE = 0.2 % / YEAR

Conclusion: Use 1% per year

# Seasonal Adjustment Factors NHDOT Group 4 (Urban Highways)



## Year 2019 Monthly Data - Urban

<u>Month</u>	ADT	Adjustment to	
		Average	Peak
Jan	11,431	1.12	1.23
Feb	11,848	1.08	1.18
Mar	12,141	1.06	1.15
Apr	12,860	1.00	1.09
May	13,551	0.95	1.03
Jun	13,785	0.93	1.02
Jul	13,942	0.92	1.01
Aug	14,016	0.92	1.00
Sep	13,379	0.96	1.05
Oct	13,339	0.96	1.05
Nov	12,265	1.05	1.14
Dec	11,496	1.12	1.22

## Year 2018 Monthly Data - Urban

<u>Month</u>	ADT	Adjustment to	
		Average	Peak
Jan	11,282	1.13	1.24
Feb	11,848	1.08	1.18
Mar	11,828	1.08	1.18
Apr	12,491	1.02	1.12
May	13,587	0.94	1.03
Jun	13,911	0.92	1.00
Jul	13,765	0.93	1.01
Aug	13,945	0.92	1.00
Sep	13,168	0.97	1.06
Oct	13,367	0.96	1.04
Nov	12,215	1.05	1.14
Dec	11,963	1.07	1.17

## Year 2017 Monthly Data - Urban

<u>Month</u>	ADT	Adjustment to	
		Average	Peak
Jan	12254	1.21	1.33
Feb	13494	1.10	1.21
Mar	14335	1.03	1.14
Apr	15004	0.99	1.09
May	15547	0.95	1.05
Jun	16310	0.91	1.00
Jul	15523	0.95	1.05
Aug	15974	0.93	1.02
Sep	15546	0.95	1.05
Oct	15104	0.98	1.08
Nov	14544	1.02	1.12
Dec	14151	1.05	1.15

<b>Average Peak-Month Factor</b>	<b>1.05</b>
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## HCM 2010 TWSC

## 1: Odell Road &amp; Existing Driveway/Ferguson Lane

## Intersection

Int Delay, s/veh 3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0 ✓	0 ✓	0 ✓	28 ✓	0 ✓	7 ✓	0 ✓	30 ✓	12 ✓	2 ✓	46 ✓	0 ✓
Future Vol, veh/h	0	0	0	28	0	7	0	30	12	2	46	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	46	46	46	54	54	54	61	61	61
Heavy Vehicles, %	0	0	0	0	0	0	0	0	5	0	3	0
Mvmt Flow	0	0	0	61	0	15	0	56	22	3	75	0

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	156	159	75	148	148	67	75	0	0	78	0	0
Stage 1	81	81	-	67	67	-	-	-	-	-	-	-
Stage 2	75	78	-	81	81	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	815	737	992	825	747	1002	1537	-	-	1533	-	-
Stage 1	932	832	-	948	843	-	-	-	-	-	-	-
Stage 2	939	834	-	932	832	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	801	736	992	823	746	1002	1537	-	-	1533	-	-
Mov Cap-2 Maneuver	801	736	-	823	746	-	-	-	-	-	-	-
Stage 1	932	830	-	948	843	-	-	-	-	-	-	-
Stage 2	925	834	-	930	830	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	9.6	0	0.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1537	-	-	-	853	1533	-	-
HCM Lane V/C Ratio	-	-	-	-	0.089	0.002	-	-
HCM Control Delay (s)	0	-	-	0	9.6	7.4	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0	-	-

# HCM 2010 TWSC

## 1: Odell Road & Existing Driveway/Ferguson Lane

### Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔			↔		
Traffic Vol, veh/h	1 ✓	0 ✓	0 ✓	24 ✓	0 ✓	9 ✓	0 ✓	73 ✓	35 ✓	15 ✓	52 ✓	0 ✓
Future Vol, veh/h	1	0	0	24	0	9	0	73	35	15	52	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	80	80	80	92	92	92	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	3	0
Mvmt Flow	4	0	0	30	0	11	0	79	38	17	60	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	198	211	60	192	192	98	60	0	0	117	0	0
Stage 1	94	94	-	98	98	-	-	-	-	-	-	-
Stage 2	104	117	-	94	94	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	765	690	1011	772	707	963	1556	-	-	1484	-	-
Stage 1	918	821	-	913	818	-	-	-	-	-	-	-
Stage 2	907	803	-	918	821	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	749	682	1011	765	699	963	1556	-	-	1484	-	-
Mov Cap-2 Maneuver	749	682	-	765	699	-	-	-	-	-	-	-
Stage 1	918	811	-	913	818	-	-	-	-	-	-	-
Stage 2	896	803	-	907	811	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.7	0	1.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1556	-	-	749	810	1484	-	-
HCM Lane V/C Ratio	-	-	-	0.005	0.051	0.012	-	-
HCM Control Delay (s)	0	-	-	9.8	9.7	7.5	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0	-	-

**Pernaw & Company, Inc**

**Looking Straight (Toward Ferguson Lane)**



**Looking Right (Toward David Lane)**



2041A

**Attachments**

**Sight Distance Photographs - Proposed Cole Circle**

*Traffic Evaluation, Proposed Residential Development, Sandown, New Hampshire*