



November 17, 1989

Ref: 50104

Mr. S.W. Simonds  
The Bay-Son Company  
13 Dartmouth College Highway  
Lyme, NH 03768

Re: Centerra Development  
Route 120  
Lebanon, New Hampshire

Dear Mr. Simonds:

As requested, Vanasse Hangen Brustlin, Inc. (VHB) has reviewed the traffic impact and access study prepared by VHB in December, 1988 in light of the most recent revised build out projections provided by the Bay-Son Company to include development of the Dartmouth College property located to the south of the Centerra property. The original traffic study assessed the traffic impacts of the year 2001 development projections to include 180,000 SF of office space, 100,000 SF of retail space, 150,000 SF of industrial space and a 100-room hotel. As a result of inclusion of the Dartmouth College property, an additional 50,00 SF of office space, 25,000 SF of retail space and 50,000 SF of industrial space is anticipated to be developed. The full build out of the development (post 2001), as currently proposed, will consist of 380,000 SF of office space, 125,000 SF of retail space, 350,000 SF of industrial space and a 100-room hotel and is anticipated to be completed post 2001 depending upon market conditions. This letter/report reviews the original traffic study with respect to the base traffic volumes, estimates the new vehicle trip generation based upon the revised site development, and evaluates the Route 120 traffic impacts and site access requirements.

#### Base Traffic Volumes

In order to determine the validity of the base traffic volumes used in the 1988 traffic study, VHB has conducted additional traffic counts along Route 120. The following table summarizes counts for the years 1987 through 1989.

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TRAFFIC VOLUME SUMMARY  
 ROUTE 120 SOUTH OF MOUNT SUPPORT ROAD

Date	ADT*	Morning Peak Hour	Evening Peak Hour	% Growth Over Previous Year (ADT)
1-29-87	11,161	891	1,140	-
6-13-88	11,395	950	1,017	2.0
10-25-89	11,713	1,105	1,048	2.8

\* ADT = Average Daily Traffic

As shown, daily traffic volume have increased by 2.0 percent from 1987-1988 and 2.8 percent from 1988-1989. It should be noted that a portion of the 1988-1989 growth is as a result of increased construction activity at the new Dartmouth Hitchcock Medical Center. This is most evident during the morning peak hour when the construction workers' commute coincides with the morning peak hour. A review of evening peak hour volumes actually shows a 9 percent decrease from 1987 levels.

Traffic projections in the original traffic study completed in 1988 assumed a 2.0 percent growth rate. This growth rate appears reasonable based upon the most recent traffic counts, and as such the original traffic projections are still valid.

Traffic Generation

Based upon the revised site development program trip generation estimates were calculated for the year 2001 and post 2001 scenarios. A comparison of the previous development program and revised program is attached. As shown in the year 2001 trip generation table, traffic increases as a result of the revised site development will result in an estimates additional 126 vehicle trips during the morning peak hour consisting of 108 entering trips and 18 exiting vehicle trips. During the evening peak hour, an additional 146 vehicle trips are estimated consisting of 35 entering and 111 exiting vehicle trips. On a daily basis approximately 1,246 new vehicle trips will be generated evenly split between 623 entering and 623 exiting trips. Under the post 2001 development program, the amount of new traffic generation will be slightly less than the year 2001 estimates.

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Route 120/Site Access Impact

A review of traffic increases along Route 120 was completed in order to quantify the impacts of the revised site development program. The following table summarizes the year 2001 projected traffic increases.

TRAFFIC INCREASES

Location	Projected			Previous Growth Assumption <sup>2</sup>
	Year 2001 <sup>1</sup>	2001 With Expansion	Increase	
Route 120 north of Site				
Morning Peak Hour	1,709	1,747	38	86
Evening Peak Hour	1,906	1,950	46	118
Route 120 south of Site				
Morning Peak Hour	2,000	2,086	86	86
Evening Peak Hour	2,484	2,586	102	118

<sup>1/</sup> Traffic Impact and Access Study, Proposed Industrial Park Development, VHB, December, 1988.

<sup>2/</sup> Ibid

As shown, as a result of the additional site development traffic increases are anticipated to range between 38 to 46 vehicles north of the site and 96 to 102 vehicles south of the site along Route 120. It should be noted that the original traffic study had assumed an induced growth along Route 120 in addition to the normal 2 percent per year growth rate. This induced growth rate was assumed as a result of the Medical Center and Centerra Development and estimated additional development of the Dartmouth College property. A comparison of the induced growth assumption and projected increases as a result of the site expansion reveal that the revised trip estimates are slightly lower than or equal to the original induced growth projections.

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In addition, level of service analysis was completed at the Route 120/Mt. Support Road/Site Drive intersection to insure satisfactory levels of service will be maintained through the year 2001. The following table summarizes the results.

LEVEL OF SERVICE SUMMARY

Location	Year 2001		Post 2001**	
	Delay	LOS*	Delay	LOS
Route 120/ Mr. Support Road/ Site Drive				
Morning Peak Hour	37.2	D	28.4	D
Evening Peak Hour	28.2	D	25.0	C

\* LOS = Level of Service

\*\* Assume roadway improvement to include widening of Route 120 northbound to two through lanes.

As shown, with the revised site development plan traffic operation will remain operating at LOS "D" or better, which is the same level of service projected in the original 1988 traffic study. It should also be noted that under post 2001 conditions it was assumed that Route 120 northbound will be widened to accommodate two through travel lanes (presently consists of one travel lane). This results in slightly improved traffic operations over year 2001 conditions.

In summary, traffic operations will not be significantly affected by the revised site development program which is to include an additional 50,000 SF office space, 50,000 SF industrial space and 25,000 SF retail space. The Route 120/Mt. Support Road/Site Drive will continue to operate at satisfactory levels of service through 2001 assuming an additional northbound through travel lane is constructed along Route 120. It is important to note that the recommendations outlined in the original traffic study should be implemented along the Route 120 Corridor. These improvements will essentially upgrade the entire Route 120 Corridor south of Mt. Support Road to a four-lane cross-section and add additional turning lanes at intersections to insure that satisfactory operations along the corridor will continue.

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If you should have any questions or comments, please call.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

A handwritten signature in black ink, appearing to read 'F. Giles Ham', written in a cursive style.

F. Giles Ham, P.E.  
Project Manager

FGH/mef

A small, handwritten mark or signature in the bottom right corner of the page, possibly initials or a date.

2001  
TRIP GENERATION SUMMARY

	Office <sup>1</sup>		Industrial <sup>2</sup>		Hotel <sup>3</sup>	Retail <sup>4</sup>				Total		Increase in New Traffic		
	180 KSF*	230 KSF	150 KSF	200 KSF	100-rooms	100 KSF Total New**	125 KSF Total New	Total	New	Total	New			
<b>Weekday AM Peak Hour</b>														
Enter	289	357	136	167	28	123	61	140	70	576	514	692	622	108
Exit	<u>43</u>	<u>53</u>	<u>19</u>	<u>23</u>	<u>22</u>	<u>52</u>	<u>26</u>	<u>60</u>	<u>30</u>	<u>136</u>	<u>110</u>	<u>158</u>	<u>128</u>	<u>18</u>
Total	332	410	155	190	50	175	87	200	100	712	624	850	750	126
<b>Weekday PM Peak Hour</b>														
Enter	51	63	18	22	18	305	152	342	171	392	239	445	274	35
Exit	<u>269</u>	<u>329</u>	<u>134</u>	<u>165</u>	<u>25</u>	<u>718</u>	<u>159</u>	<u>358</u>	<u>179</u>	<u>746</u>	<u>587</u>	<u>877</u>	<u>698</u>	<u>111</u>
Total	320	392	152	187	43	623	311	700	350	1138	826	1322	972	146
<b>Weekday Daily Trips</b>	2132	2562	924	1160	600	7430	2714	8590	4294	11088	7370	12912	8816	1246

\* KSF = 1000 Square Feet

\*\* Assume 25 percent retail traffic is internal to the site and 25 percent is impulse traffic.

1/ 180 KSF approved, 230 KSF proposed

2/ 150 KSF approved, 200 KSF proposed

3/ 100 rooms approved, 100 rooms proposed

4/ 100 KSF approved, 125 KSF proposed

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POST 2001  
TRIP GENERATION SUMMARY

	Office <sup>1</sup>		Industrial <sup>2</sup>		Hotel <sup>3</sup>	Retail <sup>4</sup>				Total		Increase in New Traffic		
	330 KSF*	380 KSF	300 KSF	350 KSF	100-rooms	100 KSF Total New**	125 KSF Total New	Total	New	Total	New			
<b>Weekday AM Peak Hour</b>														
Enter	487	550	223	248	28	123	61	140	70	861	799	966	896	97
Exit	73	82	30	34	22	52	26	60	30	177	151	198	188	17
Total	560	632	253	282	50	175	87	200	100	1038	950	1164	1064	114
<b>Weekday PM Peak Hour</b>														
Enter	85	95	29	33	18	305	152	342	171	437	284	488	317	33
Exit	445	501	220	245	25	318	159	358	179	1008	649	1129	950	101
Total	530	598	249	278	43	623	311	700	350	1445	1133	1617	1267	134
Weekday Daily Trips	3358	3734	1598	1804	600	7430	3714	8590	4295	12988	9270	14128	9833	563

\* KSF = 1000 Square Feet  
 \*\* Assume 25 percent retail traffic is internal to the site and 25 percent is impulse traffic.  
 1/ 330 KSF approved, 380 KSF proposed  
 2/ 300 KSF approved, 350 KSF proposed  
 3/ 100 rooms approved, 100 rooms proposed  
 4/ 100 KSF approved, 100 KSF proposed

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