Revaluation of Traffic

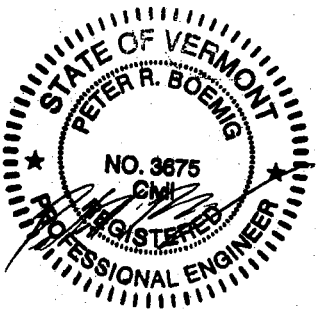
For

Westminster Business Park
Westminster, Vermont

Prepared for:

Westminster Business Park Partners
PO Box 178
Westminster Station, VT 05159

Prepared by:



SVE Associates
439 West River Road
PO Box 1818
Brattleboro, Vermont 05302-1818

April 28, 2005

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TRAFFIC STUDY

WESTMINSTER BUSINESS PARK

WESTMINSTER, VERMONT

INTRODUCTION

The purpose of this study is to revaluate the impact to traffic of a proposed business park on a parcel near Exit 5 of Interstate 91 in Westminster, Vermont. The parcel lies east of I-91, west of Route 5 and south of the I-91 access road to Exit 5 from U.S. Route 5.

The park would consist of six lots of approximately five and one half acres each. It is assumed that a 40,000 square foot building would be constructed on each lot. The park may contain highly-diversified facilities including small business, manufacturing, service business, industries or warehousing.

The access point to the park would be located south of the I-91 access road intersection with U.S. Route 5 on the west side of Route 5 and before the intersection of Route 5 with Route 123.

The scope of the evaluation of impacts will include the following intersections:

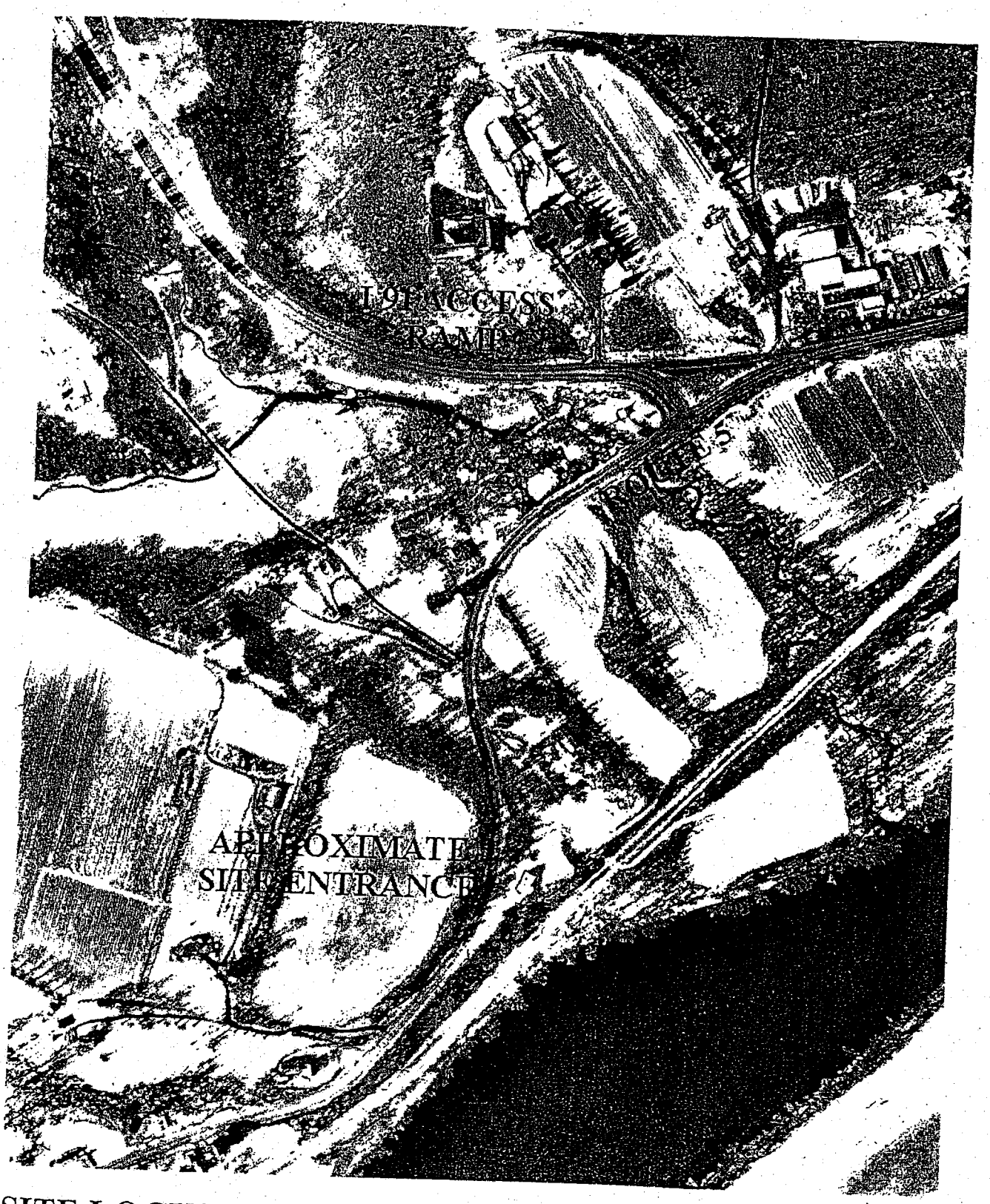
A. The project access road on to Route 5 between Route 5/I-91 access road intersection and Route 5/Route 123 intersection.

B. The impact on the I-91 access road and Route 5 intersection.

The evaluation is limited to construction on one lot only in the park.

All intersections are unsignalized. The intersections were studied for A.M. and P.M. design volumes traffic in the 2005 and 2010 design years. It is assumed that one facility would be constructed in the park. The I-91 access road and Route 5 intersection was analyzed if the project is built or if it is not scenarios.

EXHIBIT 1



SITE LOCUS

APPROXIMATE SCALE 1" = 400'

METHODOLOGY

The methodology employed for the study generally is as outlined in "Traffic Impact Evaluation", Vermont Agency of Transportation.

Traffic volumes for this study were based upon traffic counts concluded at the above-described intersection on July 12 and 13, 2004 by the Vermont Agency of Transportation (VTrans). The volumes were adjusted to the design-hour volume based upon traffic counts conducted by VTrans at Continuous Counter X-008.

The project was evaluated for its impact in the 2005 and 2010 design years and calculations were based upon "Regression Analysis for Traffic Projection" prepared by VTrans.

Projected traffic generation was based upon "Trip Generation" 6th edition, by Institute of Transportation Engineers (ITE), Industrial Park (Land Use: 130).

Level of service and intersection capacity were calculated based upon the methodology contained in the "Highway Capacity Manual" (HCM 2000) by the Transportation Research Board and the HCS Software by McTrans.

TRAFFIC VOLUMES

The traffic counts at the project location indicated that there is both an A.M. and P.M. peak. The A.M. peak flow by VTrans counts on July 13, 2004 indicate that the peak occurs between 7:45 and 8:45 A.M. The A.M. analyses were conducted assuming the peaks occurred at the same time. The P.M. peak hours in the area are from 4:45 to 5:45 P.M. The projected design hourly volumes at the I-91 access ramp road and U.S. Route 5 are 696 vehicles per hour (vph) in 2005 and 745 vph in 2010 for the A.M. and 1011 vph in 2005 and 1080 vph in 2010 for the P.M.

From the ITE traffic generation studies, the Business Park at a single lot developed with 40,000 square foot buildings would be projected to generate 238 vehicles per day. The A.M. design peak hour is projected at 103 vph and the P.M. design peak hour at 89 vph.

At full buildout the project would be expected to generate 1938 vpd with A.M. peak of 235 vph and P.M. peak of 235 vph.

TRAFFIC PERFORMANCE

Traffic performance, in general, is defined by a qualitative descriptor defined as level of service (LOS). The level of service describes operational conditions within a traffic stream and their perception by motorists and generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions,

comfort and convenience, and safety. Levels of service range from "A" representing little or no delay to "F" representing forced or breakdown condition, extreme delay.

AASHTO states that "collector streets should generally be designed for level-of-service 'C' to 'D'."

The project entrance intersection with U.S. Route 5 and the I-91 ramp with U.S. Route 5 are unsignalized stop-controlled approaches. The intersection was analyzed for capacity and level of service using unsignalized intersection analyses which focus on the critical movements that generally include: Left turns from the main street (U.S. Route 5) and all movements on the stop-controlled side street (project entrance or I-91 ramp). The level of service criteria for unsignalized intersection is given in Table 1.

TABLE 1
LEVEL OF SERVICE FOR UNSIGNALIZED INTERSECTIONS

Level of Service	Stopped Vehicle Delay per vehicle (sec)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

Analysis of the project entrance onto U.S. Route 5 at full buildout in the 2010 design hour indicate that levels of service on U.S. Route 5 would be "A" and at the project entrance would be "C".

Analysis of the U.S. Route 5/I-91 ramp intersection is summarized in Table 2

TABLE 2
INTERSECTION CAPACITY ANALYSIS – U.S. ROUTE 5/I-91 RAMP

Unsignalized Intersection	2005 No Build		2005 Build		2010 No Build		2010 Build	
Peak Hour/Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
AM								
Northbound – left turn							8.4	A
Eastbound – all movements							20.4	C
PM								
Northbound – left turn	8.9	A	9.0	A	9.0	A		A
Eastbound – all movements	37.6	C	49.3	E	58.7	F		F

An analysis was also conducted for the P.M. design hour in 2010 with two-lane exit (left and right turn lane) constructed on the I-91 ramp. This analysis indicates that the eastbound traffic would be in a "D" level of service.

GEOMETRIC CONSIDERATIONS

The geometric considerations were reviewed in great detail with the original design, and the project entrance was constructed to provide adequate sight distance and with proper fillet radius for truck traffic. It should be noted that the project entrance construction also improved the safety along existing U.S. Route 5 by improving the sight distance at a curve in the roadway.

SUMMARY

1. The development of a single lot in the park will have little effect on level of service at the studied intersections.

2. The level of service at the design hour on the I-91 ramp intersection with U.S. Route 5 north of the project entrance has a less than desirable level of service for eastbound traffic if the project is built or not. The level of service could be improved if two exist lanes (left and right turn) were provided. Based upon the balance traffic volumes it would appear that in future improvements to the intersection by VTrans should examine the use of a roundabout at this intersection.

3. The level of service at the park entrance road with Route 5 is acceptable at full buildout (all lots developed) in 2010 design year.

APPENDIX I

TRAFFIC COUNTS

The Vermont Agency of Transportation
Traffic Research/ Engineering Service
Turning Movement Report

Counter: T 2093
Counted By: J Leblanc
Weather: Cloudy
Town: 5-8 Westminster

File Name : 5-8pm04
Site Code : 31320715
Start Date : 07/12/2004
Page No : 1

US 5 & Westminster State Highway

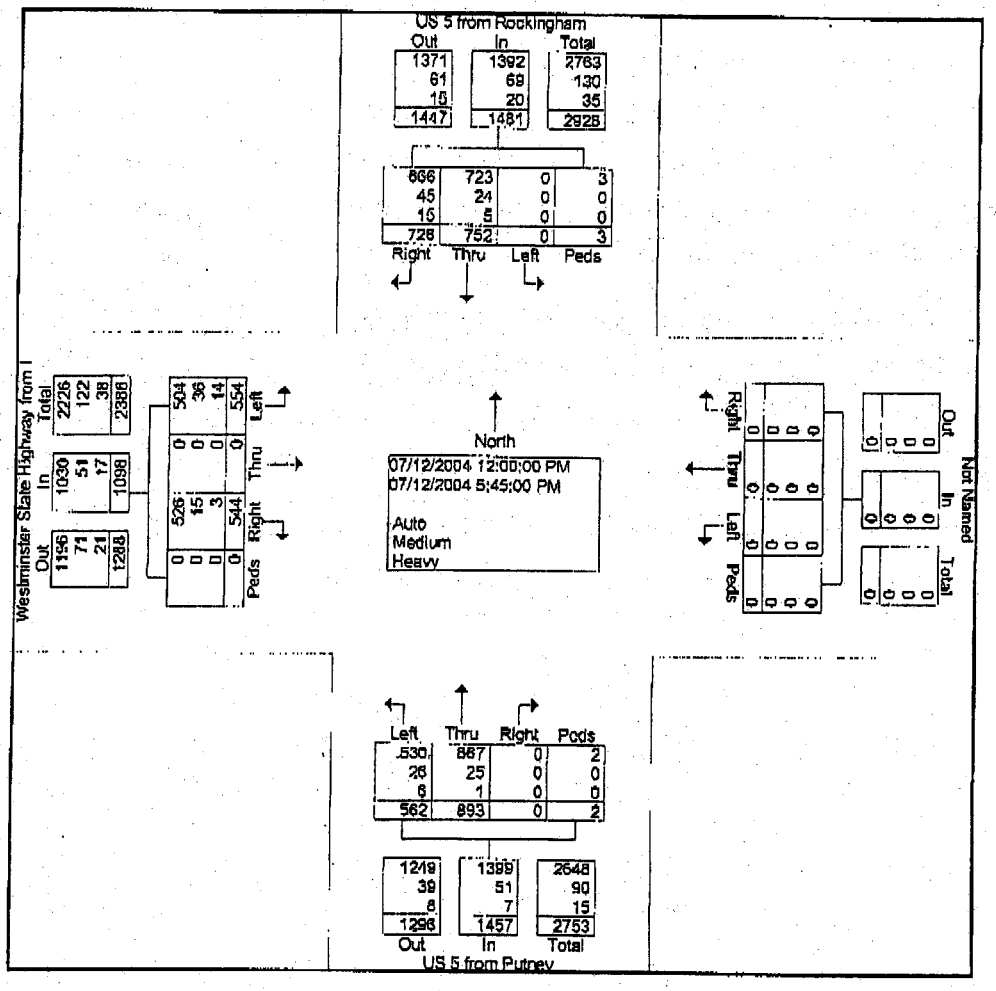
Groups Printed- Auto - Medium - Heavy

	US 5 from Rockingham From North				From East				US 5 from Putney From South				Westminster State Highway from I From West				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
12:00 PM	0	33	23	0	0	0	0	0	23	32	0	0	25	0	22	0	158
12:15 PM	0	34	28	0	0	0	0	0	13	33	0	0	16	0	19	0	143
12:30 PM	0	25	20	0	0	0	0	0	21	39	0	0	16	0	18	0	139
12:45 PM	0	20	25	0	0	0	0	0	30	51	0	0	23	0	19	0	168
Total	0	112	96	0	0	0	0	0	87	155	0	0	80	0	78	0	608
01:00 PM	0	28	23	0	0	0	0	0	27	36	0	0	27	0	24	0	165
01:15 PM	0	36	28	0	0	0	0	0	22	32	0	0	23	0	21	0	162
01:30 PM	0	35	24	2	0	0	0	0	20	26	0	0	22	0	14	0	143
01:45 PM	0	20	26	0	0	0	0	0	26	26	0	0	23	0	17	0	138
Total	0	119	101	2	0	0	0	0	95	120	0	0	95	0	76	0	608
02:00 PM	0	33	34	0	0	0	0	0	15	29	0	0	25	0	15	0	151
02:15 PM	0	32	19	0	0	0	0	0	22	38	0	2	11	0	19	0	143
02:30 PM	0	33	33	0	0	0	0	0	23	32	0	0	23	0	25	0	169
02:45 PM	0	31	30	0	0	0	0	0	28	32	0	0	21	0	21	0	163
Total	0	129	116	0	0	0	0	0	88	131	0	2	80	0	80	0	626
03:00 PM	0	28	31	0	0	0	0	0	19	35	0	0	13	0	11	0	137
03:15 PM	0	30	24	0	0	0	0	0	16	33	0	0	14	0	16	0	133
03:30 PM	0	29	29	0	0	0	0	0	9	47	0	0	13	0	10	0	137
03:45 PM	0	26	33	0	0	0	0	0	18	33	0	0	18	0	10	0	138
Total	0	113	117	0	0	0	0	0	62	148	0	0	58	0	47	0	545
04:00 PM	0	35	35	0	0	0	0	0	19	46	0	0	14	0	36	0	185
04:15 PM	0	36	41	0	0	0	0	0	25	55	0	0	39	0	40	0	236
04:30 PM	0	25	37	0	0	0	0	0	18	40	0	0	25	0	31	0	176
04:45 PM	0	41	26	1	0	0	0	0	23	48	0	0	33	0	38	0	210
Total	0	137	139	1	0	0	0	0	85	189	0	0	111	0	145	0	807
05:00 PM	0	40	48	0	0	0	0	0	33	46	0	0	32	0	30	0	229
05:15 PM	0	32	43	0	0	0	0	0	42	46	0	0	31	0	35	0	229
05:30 PM	0	44	36	0	0	0	0	0	38	34	0	0	37	0	29	0	218
05:45 PM	0	26	30	0	0	0	0	0	32	24	0	0	30	0	24	0	166
Total	0	142	157	0	0	0	0	0	145	150	0	0	130	0	118	0	842
Grand Total	0	752	726	3	0	0	0	0	562	893	0	2	554	0	544	0	4036
Apprch %	0.0	50.8	49.0	0.2	0.0	0.0	0.0	0.0	38.6	61.3	0.0	0.1	50.5	0.0	49.5	0.0	
Total %	0.0	18.6	18.0	0.1	0.0	0.0	0.0	0.0	13.9	22.1	0.0	0.0	13.7	0.0	13.5	0.0	

The Vermont Agency of Transportation
Traffic Research/ Engineering Service
Turning Movement Report

Counter: T 2093
Counted By: J Leblanc
Weather: Cloudy
Town: 5-8 Westminster

File Name : 5-8pm04
Site Code : 31320715
Start Date : 07/12/2004
Page No : 2



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US 5 & Westminster State Highway

Groups Printed- Auto - Medium - Heavy

	US 5 from Rockingham From North				From East				US 5 from Putney From South				Westminster State Highway from I From West				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:00 AM	0	11	23	0	0	0	0	0	16	12	0	0	9	0	9	0	80
06:15 AM	0	11	18	0	0	0	0	0	18	9	0	0	7	0	11	0	74
06:30 AM	0	14	15	0	0	0	0	0	25	10	0	0	12	0	21	0	97
06:45 AM	0	21	13	0	0	0	0	0	19	12	0	0	13	0	15	0	93
Total	0	57	69	0	0	0	0	0	78	43	0	0	41	0	56	0	344
07:00 AM	0	24	23	0	0	0	0	0	27	23	0	0	16	0	22	0	135
07:15 AM	0	17	29	0	0	0	0	0	17	22	0	0	25	0	13	0	123
07:30 AM	0	19	26	0	0	0	0	0	28	37	0	0	23	0	18	0	151
07:45 AM	0	25	32	0	0	0	0	0	19	37	0	0	23	0	24	0	160
Total	0	85	110	0	0	0	0	0	91	119	0	0	87	0	77	0	569
08:00 AM	0	31	25	0	0	0	0	0	30	27	0	0	24	0	15	0	152
08:15 AM	0	25	22	0	0	0	0	0	29	19	0	0	27	0	19	0	141
08:30 AM	0	26	29	0	0	0	0	0	30	26	0	0	27	0	19	0	157
08:45 AM	0	23	29	0	0	0	0	0	27	32	0	0	24	0	18	0	153
Total	0	105	105	0	0	0	0	0	116	104	0	0	102	0	71	0	603
09:00 AM	0	18	20	0	0	0	0	0	32	33	0	0	33	0	21	0	157
09:15 AM	0	25	29	1	0	0	0	0	27	16	0	0	21	0	17	0	136
09:30 AM	0	20	13	0	0	0	0	0	20	32	0	0	21	0	25	0	131
09:45 AM	0	24	22	0	0	0	0	0	21	24	0	0	24	0	17	0	132
Total	0	87	84	1	0	0	0	0	100	105	0	0	99	0	80	0	556
10:00 AM	0	29	26	0	0	0	0	0	17	24	0	0	32	0	24	0	152
10:15 AM	0	30	20	0	0	0	0	0	13	27	0	0	25	0	14	0	129
10:30 AM	0	16	19	0	0	0	0	0	35	31	0	0	20	0	19	0	140
10:45 AM	0	24	24	0	0	0	0	0	24	31	0	0	25	0	22	2	152
Total	0	99	89	0	0	0	0	0	89	113	0	0	102	0	79	2	573
11:00 AM	0	18	30	0	0	0	0	0	18	28	0	0	20	0	14	0	128
11:15 AM	0	20	26	0	0	0	0	0	21	22	0	0	20	0	21	0	130
11:30 AM	0	26	28	0	0	0	0	0	16	23	0	0	18	0	30	0	141
11:45 AM	0	22	31	0	0	0	0	0	19	34	0	0	22	0	19	0	147
Total	0	86	115	0	0	0	0	0	74	107	0	0	80	0	84	0	546
Grand Total	0	519	572	1	0	0	0	0	548	591	0	0	511	0	447	2	3191
Apprch %	0.0	47.5	52.4	0.1	0.0	0.0	0.0	0.0	48.1	51.9	0.0	0.0	53.2	0.0	46.6	0.2	
Total %	0.0	16.3	17.9	0.0	0.0	0.0	0.0	0.0	17.2	18.5	0.0	0.0	16.0	0.0	14.0	0.1	

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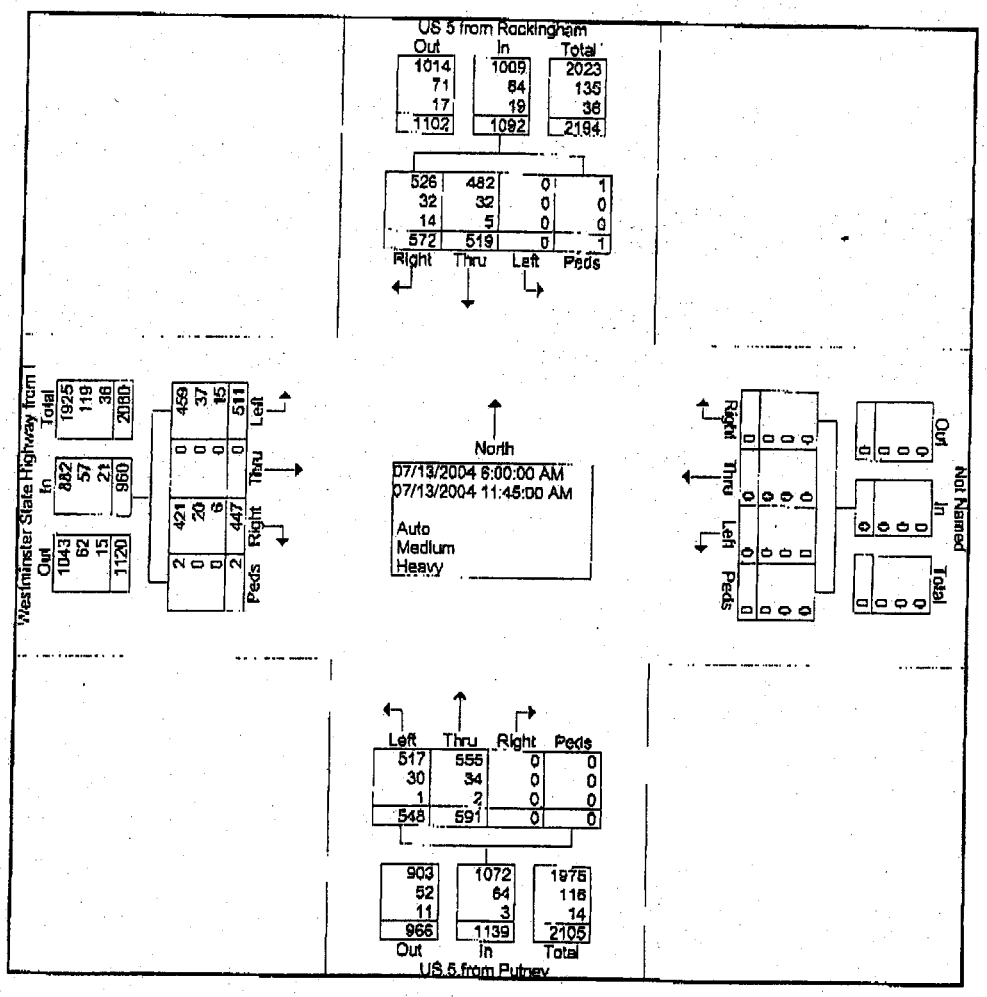

Run Date: 2005/03/28

Vermont Agency of Transportation
Technical Services Division
Traffic Research Unit
Monthly Summary of Permanent Site Data
July , 2004

Site ID : P6X008

Town: Rockingham

Route No: US5

County : Windham

Location : Rockingham: US5 0.35 mi S of IMTEC Lane

AADT: 6000

Day	Wkd	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
1	THU	31	15	16	26	44	135	291	364	411	419	361	458	487	442	486	563	523	586	385	279	241	176	105	67	7001
2	FRI	30	24	17	22	37	130	254	357	419	419	442	503	581	553	520	632	658	621	450	342	270	222	149	120	7772
3	SAT	48	28	19	12	23	48	109	180	236	399	474	521	483	425	449	429	462	342	304	213	195	147	179	83	5746
4	SUN	51	35	15	7	17	22	42	74	136	249	331	416	441	416	410	408	385	327	291	282	245	160	140	141	5042
5	MON	55	11	16	8	14	34	74	139	171	270	325	408	455	461	400	391	378	352	250	204	159	116	82	46	4819
6	TUE	14	14	19	18	46	133	295	357	402	388	424	451	531	458	459	588	592	535	395	234	227	167	94	51	6890
7	WED	27	14	15	19	45	129	289	379	435	393	403	446	504	476	459	509	565	567	354	277	241	213	78	59	6886
8	THU	28	12	20	14	48	101	277	350	356	355	460	455	457	407	498	535	541	567	424	247	191	161	80	66	6680
9	FRI	20	22	13	15	51	129	292	386	484	430	474	480	557	531	517	609	661	609	428	339	261	229	142	83	7761
10	SAT	43	26	19	20	27	68	111	165	221	365	447	475	432	418	480	460	411	378	340	281	251	197	130	83	5848
11	SUN	36	27	15	11	23	61	79	95	208	262	379	391	487	468	477	428	487	389	370	319	245	174	98	44	5573
12	MON	26	13	18	14	39	136	298	386	440	384	431	453	498	419	489	526	578	532	348	226	177	139	73	49	6691
13	TUE	25	11	17	15	60	131	285	394	430	381	389	453	443	445	445	539	539	506	334	206	179	127	82	44	6480
14	WED	25	14	13	20	52	113	312	390	469	415	418	422	488	460	526	539	618	568	332	274	209	135	71	57	6940
15	THU	19	16	15	16	51	127	290	367	400	375	360	459	479	456	490	550	554	568	367	258	230	177	110	55	6789
16	FRI	27	24	17	16	61	128	308	370	464	420	441	526	562	544	524	649	656	613	446	321	271	201	150	89	7868
17	SAT	51	47	16	18	29	64	141	204	255	385	495	511	478	456	458	430	432	390	334	285	239	188	107	88	6101
18	SUN	42	31	15	7	19	42	73	98	145	283	341	381	475	421	405	428	407	341	355	256	215	169	84	49	5074
19	MON	19	10	15	17	52	134	276	399	419	347	407	432	456	383	450	519	558	555	343	233	197	126	99	53	6456
20	TUE	23	22	15	19	60	135	296	369	465	379	370	445	517	454	457	585	599	602	383	297	216	154	83	58	7023
21	WED	26	19	18	17	45	131	286	404	432	404	446	459	512	497	485	548	621	610	336	270	242	187	70	60	7125
22	THU	34	15	13	10	56	121	303	401	417	347	389	443	513	443	516	584	583	606	383	325	257	177	88	66	7050
23	FRI	22	21	15	22	45	131	275	393	422	399	433	540	613	519	529	625	618	612	425	323	252	183	129	76	7622
24	SAT	46	33	20	16	23	59	107	178	260	398	469	515	503	474	462	453	412	375	331	255	246	183	109	74	6001
25	SUN	39	22	17	13	16	26	64	98	160	287	333	415	436	452	458	405	383	434	345	285	203	156	90	40	5177
26	MON	29	11	15	18	46	118	305	413	402	404	393	474	536	461	455	549	602	540	359	269	218	161	89	48	6915
27	TUE	31	13	13	20	53	135	291	372	436	368	419	410	497	446	481	537	564	499	329	215	167	128	89	51	6554
28	WED	27	16	15	16	43	117	278	374	445	402	418	462	516	467	473	524	536	604	404	292	216	131	126	84	6986
29	THU	41	18	14	19	48	126	292	386	407	359	427	443	480	511	462	563	666	558	357	288	252	182	100	71	7070
30	FRI	24	16	20	21	54	114	299	370	410	407	425	537	578	500	583	618	661	645	454	344	306	226	134	118	7863
31	SAT	49	34	25	12	23	60	121	175	245	396	468	531	481	462	531	494	462	460	446	482	475	369	317	169	7787
Averages		32	20	16	16	40	101	226	303	356	371	412	462	499	462	479	523	541	512	368	281	235	176	128	72	6635

	SUN	MON	TUE	WED	THU	FRI	SAT
Hours Averages	217	260	281	291	289	324	262
Number of Hours	56	96	96	96	120	120	120
Daily Average	5217	6231	6737	6984	6926	7777	6297

Monthly Totals	
Total Daily	205672
Total Weekdays	153323
Total Weekends	52349

Averages			
MADT for	744	Hours	6635
Weekday for	528	Hours	6969
Weekend for	216	Hours	5817

APPENDIX II

CALCULATIONS FOR TRIP GENERATION AND DISTRIBUTION, TRAFFIC COUNT ADJUSTMENT

SVE ASSOCIATES
P.O. Box 1818
439 West River Road
BRATTLEBORO, VERMONT 05302
Phone (802) 257-0561
Fax (802) 257-0721

JOB Westminster Business PARK - B2615G
SHEET NO. 1 OF
CALCULATED BY PRB DATE April 13, 2005
CHECKED BY DATE
SCALE

TRIP GENERATION

Assume: One 40 000 sq.ft. building in 2005
Six 40 000 sq.ft. buildings in 2010

Use: Institute of Transportation Engineers "Trip Generation", 7th edition
Code 130 Land Use "Industrial PARK"

Average vehicle trip ends - weekday

$T = 4.96(x) + 747.75$ (Average rate = 6.96 per gross floor area

single building = 278 vpd
full buildout = 1938 vpd

Peak Hour adjacent Street traffic - A.M.

$Ln(T) = 0.77 Ln(x) + 1.09$

single bldg. = 51 vph (82% enter = 42 vph, 18% exit = 9 vph)
full bldg. = 202 vph (82% enter = 166 vph, 18% exit = 36 vph)

Peak Hour adjacent street traffic - P.M.

$T = 0.77(x) + 42.11$ (0.86 average rate)

single bldg. = 73 vph (21% enter = 15 vph ; 79% exit = 58 vph)
full bldg. = 227 vph (21% enter = 48 vph ; 79% exit = 179 vph)

SVE ASSOCIATES
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Phone (802) 257-0561
Fax (802) 257-0721

JOB WESTMINSTER BUSINESS PARK - B2615G
SHEET NO. 2 OF
CALCULATED BY PAB DATE April 13, 2005
CHECKED BY DATE
SCALE

Peak Hour of Generator - A.M.

$T = 0.66(X) + 76.27$ (Average = 0.82)

single bldg. = 103 vph (37 vph)
full bldg. = 275 vph

Peak Hour of Generator - P.M.

$T = 0.73(X) + 59.62$ (Average = 0.86)

single bldg. = 89 vph (34 vph)
full bldg. = 275 vph

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JOB WESTMINSTER BUSINESS PARK - B26156
SHEET NO. 3 OF
CALCULATED BY PRB DATE April 13, 2005
CHECKED BY DATE
SCALE

Traffic Count Adjustments

Design Hour adjustment - 30th highest hour

- counts by VTrans @ US 5 and I-91 ramp - July 12, 13, 2004
- counter X-8 on Route 5 Bellows Falls

$$\frac{\text{30th hr @ X 8} = 648}{\text{peak hr @ X8 day of count} = 578} = 1.12$$

Growth Factors:

2004 = 1
2005 = 1.02
2010 = 1.09

SVE ASSOCIATES
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JOB Westminster Business Park B26156
SHEET NO. 4 OF
CALCULATED BY PRB DATE April 24, 2005
CHECKED BY DATE
SCALE

TURNING MOVEMENTS -
RTS - I 91 RAMP

P.M.

					8%	4%	
					.80	.89	
					187	192	
					175	179	
					153	157	
					From North Bellows Falls		
9%	.90	162	152	133	From west I-91		
3%	.87	161	151	132			
					From south Westminster		
					136	174	counts
					155	199	2005
					166	212	2010
					.81	.91	phf
					6%	3%	% trucks

A.M.

					132 8%	131 7%	
					123 .84	122 .86	
					108	107	
					From north		
10%	.93	123	115	101	From West		
6%	.80	94	88	77			
					From south		
					108	109	counts
					123	125	2005
					132	133	2010
					.90	.73	phf
					6%	6%	% trucks

SVE ASSOCIATES
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JOB Westminster Business Park B26156
SHEET NO. 5 OF
CALCULATED BY PRB DATE April 21, 2005
CHECKED BY DATE
SCALE

PROJECT SITE / with trip generated (built project)

PM

8%	39%	% truck
.9	.9	phf
25	353	2005
8	370	2010

52% From I-91

.9 8% 93 70 53%

Project entrance

.9 8% 86 28 48%

48% From Westminster

7	354	2005
23	378	2010
.9	.9	
8%	4%	

AM

8%	6%
.9	.9
95	210
24	184

57%

8% .9 21 5 57%

8% .9 15 4 47%

47%

18	248
71	265
.9	.9
8%	6%

SVE ASSOCIATES
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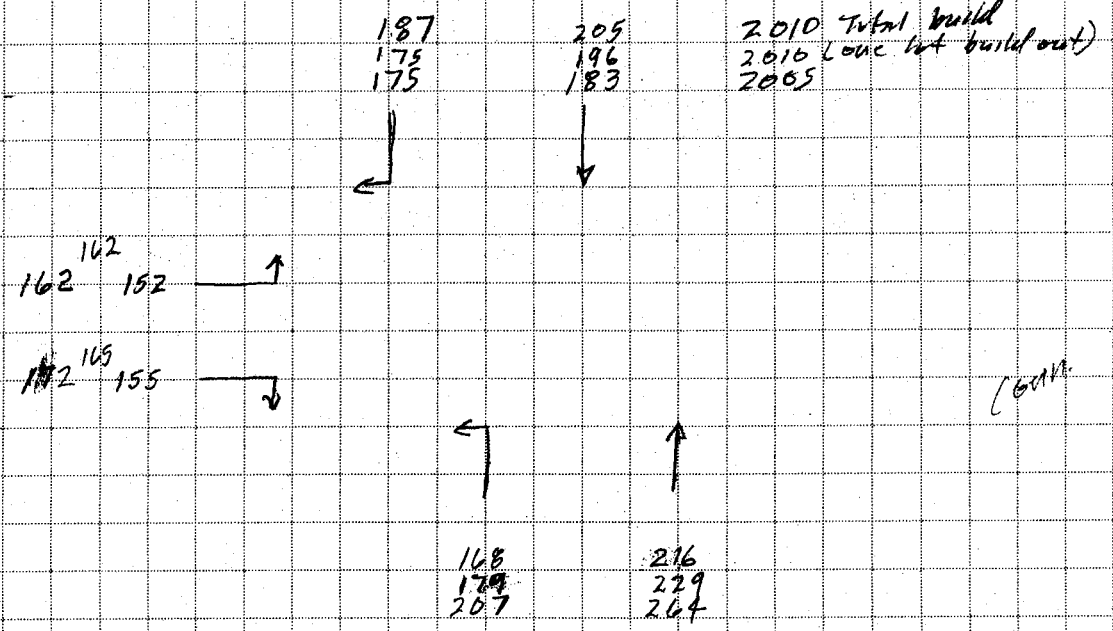
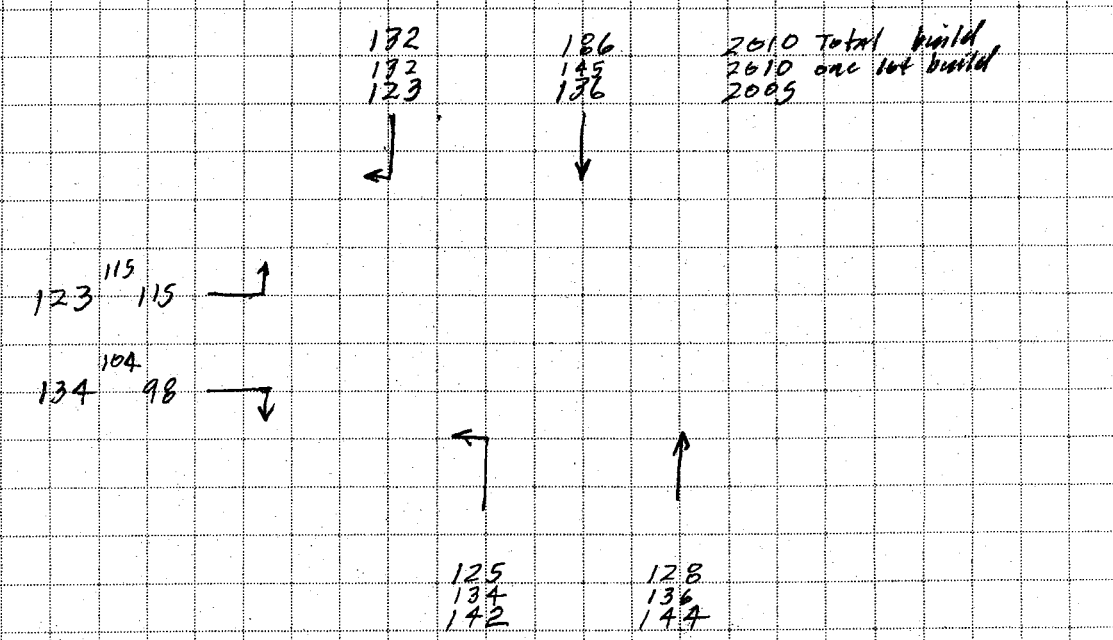
JOB Westminster Business Park B2615G
SHEET NO. 6 OF
CALCULATED BY PRB DATE April 28, 2005
CHECKED BY DATE
SCALE

RT5 - I 91 Ramp (Build condition)

P.M.



A.M.



APPENDIX III

CAPACITY ANALYSIS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/I-91 RAMP
Agency/Co.	SVE ASSOCIATES	Jurisdiction	VTRANS
Date Performed	4/23/05	Analysis Year	2005
Analysis Time Period	PM-NO BUILD		
Project Description			
East/West Street:	I-91 RAMP	North/South Street:	US ROUTE 5
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	155	199	0	0	179	175
Peak-Hour Factor, PHF	0.81	0.91	1.00	1.00	0.89	0.80
Hourly Flow Rate, HFR	191	218	0	0	201	218
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	152	0	151
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	168	0	173
Percent Heavy Vehicles	0	0	0	6	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LTR	
v (vph)	191						341	
C (m) (vph)	1119						434	
v/c	0.17						0.79	
95% queue length	0.61						6.90	
Control Delay	8.9						37.6	
LOS	A						E	
Approach Delay	--	--				37.6		
Approach LOS	--	--				E		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/I-91 RAMP
Agency/Co.	SVE ASSOCIATES	Jurisdiction	
Date Performed	4/23/05	Analysis Year	2005
Analysis Time Period	PM-BUILD		

Project Description	WESTMINSTER BUSINESS PARK-B2615G
East/West Street: I-91 RAMP	North/South Street: US ROUTE 5
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	168	216	0	0	183	175
Peak-Hour Factor, PHF	0.81	0.91	1.00	1.00	0.89	0.80
Hourly Flow Rate, HFR	207	237	0	0	205	218
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	152	0	155
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	168	0	178
Percent Heavy Vehicles	0	0	0	9	0	3
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LTR	
v (vph)	207						346	
C (m) (vph)	1115						402	
v/c	0.19						0.86	
95% queue length	0.68						8.42	
Control Delay	9.0						49.3	
LOS	A						E	
Approach Delay	--	--				49.3		
Approach LOS	--	--				E		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/I-91 RAMP
Agency/Co.	SVE ASSOCIATES	Jurisdiction	
Date Performed	4/23/05	Analysis Year	2005
Analysis Time Period	PM-BUILD(TWO LANE EAST)		

Project Description	WESTMINSTER BUSINESS PARK-B2615G
East/West Street: I-91 RAMP	North/South Street: US ROUTE 5
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	168	216	0	0	183	175
Peak-Hour Factor, PHF	0.81	0.91	1.00	1.00	0.89	0.80
Hourly Flow Rate, HFR	207	237	0	0	205	218
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	152	0	155
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	168	0	178
Percent Heavy Vehicles	0	0	0	9	0	3
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	207					168		178
C (m) (vph)	1115					260		833
v/c	0.19					0.65		0.21
95% queue length	0.68					4.05		0.81
Control Delay	9.0					41.0		10.5
LOS	A					E		B
Approach Delay	--	--				25.3		
Approach LOS	--	--				D		

>

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/I-91 RAMP
Agency/Co.	SVE ASSOCIATES	Jurisdiction	VTRANS
Date Performed	4/23/05	Analysis Year	2010
Analysis Time Period	PM- NO BUILD		
Project Description	WESTMINSTER BUSINESS PARK-B2615G		
East/West Street:	I-91 RAMP	North/South Street:	US ROUTE 5
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	166	212	0	0	192	
Peak-Hour Factor, PHF	0.81	0.91	1.00	1.00	0.89	0.80
Hourly Flow Rate, HFR	204	232	0	0	215	218
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	162	0	161
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	180	0	185
Percent Heavy Vehicles	0	0	0	9	0	3
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LTR	
v (vph)	204						365	
C (m) (vph)	1106						399	
v/c	0.18						0.91	
95% queue length	0.67						9.77	
Control Delay	9.0						58.7	
LOS	A						F	
Approach Delay	--	--				58.7		
Approach LOS	--	--				F		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/I-91 RAMP
Agency/Co.	SVE ASSOCIATES	Jurisdiction	VTRANS
Date Performed	4/23/05	Analysis Year	2010
Analysis Time Period	PM- NO BUILD(2LANES EAST)		

Project Description	WESTMINSTER BUSINESS PARK- B2615G
East/West Street: I-91 RAMP	North/South Street: US ROUTE 5
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	166	212	0	0	192	187
Peak-Hour Factor, PHF	0.81	0.91	1.00	1.00	0.89	0.80
Hourly Flow Rate, HFR	204	232	0	0	215	233
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	162	0	161
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	180	0	185
Percent Heavy Vehicles	0	0	0	9	0	3
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	204					180		185
C (m) (vph)	1091					260		822
v/c	0.19					0.69		0.23
95% queue length	0.69					4.62		0.86
Control Delay	9.1					45.0		10.6
LOS	A					E		B
Approach Delay	--	--				27.6		
Approach LOS	--	--				D		

>

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/I-91 RAMP
Agency/Co.	SVE ASSOCIATES	Jurisdiction	VTRANS
Date Performed	4/23/05	Analysis Year	2010
Analysis Time Period	PM- BUILD(2LANES EAST)		

Project Description: WESTMINSTER BUSINESS PARK-B2615G

East/West Street: I-91 RAMP | North/South Street: US ROUTE 5

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	179	229	0	0	196	
Peak-Hour Factor, PHF	0.81	0.91	1.00	1.00	0.89	0.80
Hourly Flow Rate, HFR	220	251	0	0	220	233
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	162	0	165
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	180	0	189
Percent Heavy Vehicles	0	0	0	9	0	3
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	220					180		189
C (m) (vph)	1087					236		817
v/c	0.20					0.76		0.23
95% queue length	0.76					5.43		0.89
Control Delay	9.2					56.8		10.7
LOS	A					F		B
Approach Delay	--	--				33.2		
Approach LOS	--	--				D		

>

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/I-91 RAMP
Agency/Co.	SVE ASSOCIATES	Jurisdiction	VTRANS
Date Performed	4/23/05	Analysis Year	2010
Analysis Time Period	AM- BUILD		
Project Description	WESTMINSTER BUSINESS PARK- B2615G		
East/West Street:	I-91 RAMP	North/South Street:	US ROUTE 5
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	134	136	0	0	145	132
Peak-Hour Factor, PHF	0.90	0.73	1.00	1.00	0.86	0.84
Hourly Flow Rate, HFR	148	186	0	0	168	157
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	115	0	104
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.93	1.00	0.80
Hourly Flow Rate, HFR	0	0	0	123	0	129
Percent Heavy Vehicles	0	0	0	10	0	6
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	148					123		129
C (m) (vph)	1213					370		866
v/c	0.12					0.33		0.15
95% queue length	0.42					1.43		0.52
Control Delay	8.4					19.5		9.9
LOS	A					C		A
Approach Delay	--	--				14.6		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PRB	Intersection	US 5/PROJECT ENTRANCE
Agency/Co.	SVE ASSOCIATES	Jurisdiction	VTRANS
Date Performed	4/23/05	Analysis Year	2010
Analysis Time Period	PM- BUILD		

Project Description	WESTMINSTER BUSINESS PARK-B2615G
East/West Street: PROJECT ENTRANCE	North/South Street: US ROUTE 5
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	23	378	0	0	330	8
Peak-Hour Factor, PHF	0.90	0.90	1.00	1.00	0.90	0.90
Hourly Flow Rate, HFR	25	420	0	0	366	8
Percent Heavy Vehicles	8	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	93	0	86
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.90
Hourly Flow Rate, HFR	0	0	0	103	0	95
Percent Heavy Vehicles	0	0	0	8	0	8
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LTR	
v (vph)	25						198	
C (m) (vph)	1152						428	
v/c	0.02						0.46	
95% queue length	0.07						2.38	
Control Delay	8.2						20.4	
LOS	A						C	
Approach Delay	--	--				20.4		
Approach LOS	--	--				C		

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