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CHITTENDEN COUNTY METROPOLITAN PLANNING ORGANIZATION

Analysis of Through Traffic Mitigation Alternatives

Proctor/Hadley/Meadow Neighborhood, South Burlington

December 9, 1999

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The preparation of this document has been financed through transportation planning funds provided by the U.S. Department of Transportation under the Transportation Equity Act for the 21st Century (TEA-21) and by matching funds provided by Chittenden County's 18 municipalities, the Vermont Agency of Transportation, and the Chittenden County Transportation Authority.

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INTRODUCTION

This memo summarizes alternatives proposed to remove through traffic from the Proctor / Meadow / Hadley Neighborhood located on the east side of US 7 just north of I-189 (See **Figure 1**). The neighborhood streets serve as a shortcut between US 7 and Swift Street. Based on a recent license plate survey conducted by Resource Systems Group (RSG), approximately 80 to 85% of the traffic in the neighborhood is cut though traffic. The site identified in **Figure 1** refers to the proposed O'dell Planned Unit Development (PUD).

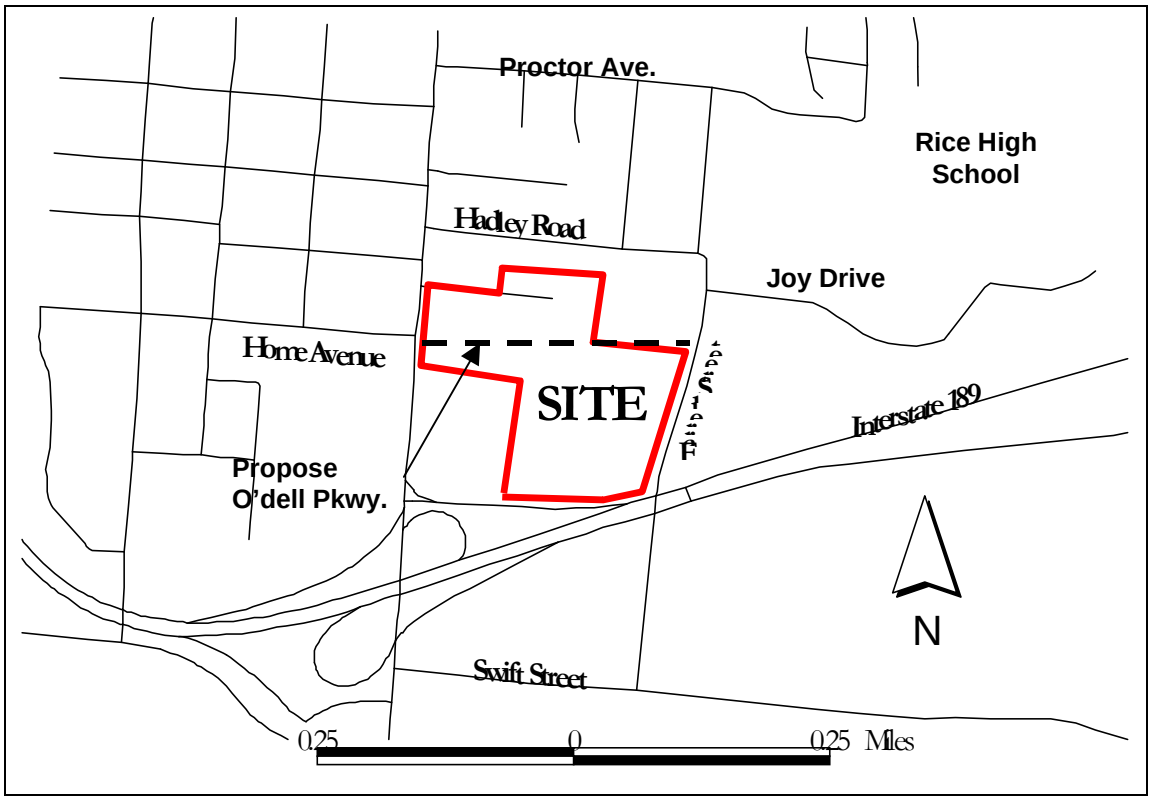

Figure 1. Study Area *(Source: Resource Systems Group 11/22/99 Memo)*

The City of South Burlington requested assistance from the Chittenden County Metropolitan Planning Organization (CCMPO) to analyze the following alternatives:

1. Dead-end Farrell Street with O'dell Parkway connecting US 7 to Farrell.
2. Dead-end Farrell Street without O'dell Parkway connected through to Farrell Street.
3. Make Farrell Street one-way southbound between Hadley Road and Joy Drive with O'dell Parkway connecting US 7 to Farrell.
4. Make Farrell Street one-way southbound between Hadley Road and Joy Drive with O'dell Parkway connecting US 7 to Farrell.

This analysis estimates how effective each alternative is at reducing through traffic in the Neighborhood. In addition, the analysis considers how the redistribution of traffic effects performance at the following Shelburne Road and Swift Street intersections:

1. US 7 and Flynn Avenue
2. US 7 and Proctor Avenue
3. US 7 and Hadley Road
4. US 7 and Home Avenue
5. US 7 and Shelburne Plaza
6. US 7 and I-189
7. US 7 and Swift Street
8. Swift Street and Farrell Street
9. Swift Street and Spear Street

SCENARIOS / ASSUMPTIONS

The scenarios presented in **Table 1** were developed for 2000 and 2005 and combine the Farrell Street alternatives listed above with expected development and highway system changes. The intersection analyses are based on Design Hour Volume (DHV) traffic projections prepared by Resource System Group in *"Traffic Impact Analysis, O'dell Parkway Planned Unit Development, South Burlington, Vermont"*. (November 1999).

Scenario Number	Year	Highway Network	Farrell St.	O'dell Parkway
1	2000	Existing	Existing	No
2	2000	Existing	Dead End	No
3	2000	Existing	Dead End	Through
4	2000	Existing	One-Way SB	No
5	2000	Existing	One-Way SB	Through
6	2005	Existing	Existing	No
7	2005	Committed	Existing	No
8	2005	Committed	Dead End	No
9	2005	Committed	Dead End	Through
10	2005	Committed	One-Way SB	No
11	2005	Committed	One-Way SB	Through

Table 1. Scenarios

The Committed highway network includes regional projects such as the Southern Connector, Shelburne Road reconstruction, Burlington Main Street reconstruction, Kennedy Drive reconstruction and the Exit 13 northbound on-ramp.

Year 2000 Land Use Assumptions

- O'dell Parkway PUD is not included

Year 2005 Land Use Assumptions

- In addition to a background growth of 1% per year, 2005 traffic projections include trip generation from:

    1. 2000 new IDX employees;
    2. Staybridge Suites, an extended stay motel;
    3. Harbor Sunset Motel
    4. L&M Park
    5. Gateway Mall (include a new Grand Union)
    6. O'dell Parkway PUD.

    For more information on these uses, refer to the "*Traffic Impact Analysis, O'dell Parkway Planned Unit Development, South Burlington, Vermont*" (RSG, November, 1999).

TRAFFIC PROJECTIONS

Attachment A presents the intersection turning movements on which the performance analyses are based. The base numbers were developed by Resource Systems Group for the O'dell Parkway Traffic Impact Study cited above. In addition, the Chittenden County Transportation Model (the Model) is used to estimate how those base turning movements would change under the various Farrell Street and O'dell Parkway alternatives. A regional transportation Model has been used in Chittenden County for approximately ten years. The current model was updated in 1998. The model is useful in estimating changing travel routes as a result of changes in highway the network, such as dead ending a road.

The turning movements are provided for the Design Hour Volume, which occurs during the PM peak hour. The DHV is defined as the 30th highest hour of the year. Based on this definition, traffic will be higher for only 3% of the hours throughout the year.

EFFECTIVENESS OF ALTERNATIVES

The regional Model was used to estimate the reduction in neighborhood traffic as a result of the alternatives. **Table 2** compares the change in through traffic and total traffic. Traffic generated and attracted by Rice High School is considered "Not Through" traffic. **Table 2** shows that the Farrell Street Dead End alternatives reduce total neighborhood traffic by about 65 to 70% while the one-way southbound alternatives reduce total traffic between 30 and 40%. It is also

interesting to note that the Southern Connector, which is included in the Committed Network, is effective at reducing total traffic by about 6%.

Scenario				Neighborhood Traffic (Vehicles per Hour)			Estimated % Reduction	
Year	Base Network	Farell	Odell Parkway	Not Through	Through	Total	Through Trips	Total Trips
2000	Existing	Existing	No	133	518	651	0%	0%
2000	Existing	Dead End	No	133	83	216	-84%	-67%
2000	Existing	Dead End	Through	133	83	216	-84%	-67%
2000	Existing	1 Way SB	No	133	298	431	-42%	-34%
2000	Existing	1 Way SB	Through	133	305	438	-41%	-33%
2005	Existing	Existing	No	146	540	686	0%	0%
2005	Committed	Existing	No	146	500	646	-7%	-6%
2005	Committed	Dead End	No	146	44	190	-92%	-72%
2005	Committed	Dead End	Through	146	44	190	-92%	-72%
2005	Committed	1 Way SB	No	146	250	396	-54%	-42%
2005	Committed	1 Way SB	Through	146	278	424	-49%	-38%

Table 2. Effect of Alternatives on Neighborhood Traffic

CONGESTION ANALYSIS METHOD

Level of service (LOS) is the standard measure used to quantify the operational performance of highway facilities as perceived by the user. The grades A, B, C, D, E and F are the five possible LOS ratings. Similar to school report cards, an LOS A indicates that the facility is operating exceptionally well with free flow, while an LOS F indicates that demand exceeds capacity and the facility is failing. There is almost universal agreement that levels of service A, B and C are acceptable and LOS F is not. Because Level of service ratings attempt to measure how well a facility is operating as perceived by the driver, there is considerable debate about the acceptability of LOS D. On rural highway facilities where speeds are often higher and drivers expect a higher level of mobility, LOS D may not be acceptable. On the other hand, in urban areas and activity centers where drivers expect and are accustomed to greater delays, an LOS D is often considered acceptable and is often wide spread. In some cases, LOS E may be acceptable in urban areas and activity centers.

Level of service for both signalized and unsignalized intersections is measured in terms of average delay per vehicle. The delay, referred to as control delay, includes the time required to slow down when approaching an intersection, the time a vehicle is stopped, the time required for a line of vehicles (the queue) to move up to the intersection, and the time required to accelerate. The table presents the relationship between LOS and control delay. As indicated below, the Highway Capacity Manual (HCM) has lower delay thresholds for unsignalized intersections. The HCM explains this difference by arguing that drivers at signalized intersections are able to relax during red cycles. Drivers at unsignalized intersections must stay alert and be ready to move when gaps in opposing traffic are large enough. Furthermore, unsignalized intersections are

smaller volume facilities and drivers therefore expect less delay. And finally, there is greater variability in delay encountered at unsignalized intersections compared to pre-timed signals.

LOS	Characteristics	Stop Controlled	Traffic Signal
A	Little or no delay	< 10	< 10.0
B	Short delays	> 10 and < 15	> 10 and < 20
C	Average delays	>15 and < 25	>20 and < 35
D	Long delays	> 25 and < 35	> 35 and < 55
E	Very Long delays	> 35 and < 50	> 55 and < 80
F	Extreme delays	> 50	> 80

Table 3. LOS Criteria For Intersections (seconds)

ANALYSIS OF SIGNALIZED INTERSECTIONS

Tables 4-10 on the following pages present the LOS results for the signalized intersections studied. LOS and the corresponding delay is provided for the overall intersection and for each approach. At the US 7 intersections, LOS and delay are also provided for the northbound and southbound through lanes. This information is provided because US 7 is a principal arterial. Its function is to serve through traffic as efficiently as possible. Therefore, the goal has been to maintain, where possible, a LOS D or better for the through movements.

The results below are based on traffic signal timings optimized within the constraints of the existing signal equipment and intersection geometry (number of lanes). All of the US 7 intersections studied, with the exception of the US 7 / Flynn Avenue intersection, work together as a coordinated system. In order to maintain coordination, the cycle lengths need to be the same. RSG concluded in the *O'dell Parkway PUD Traffic Impact Study* that coordination can be maintained in the corridor with cycle lengths between 80 and 90 seconds. The tables indicate which cycle lengths have been assumed.

Year	Scenario	Overall Intersection		US 7 Southbound				Shop Ctr		US 7 Northbound				Flynn Ave		Cycle Length
				Approach		Through		Approach		Approach		Through		Approach		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
2000	1	C	22	C	26	C	26	C	25	B	14	A	9	D	36	80
2000	2	C	23	C	25	C	25	C	25	B	13	A	9	D	50	80
2000	3	C	24	C	26	C	27	C	25	C	20	A	9	D	33	80
2000	4	C	21	C	25	C	26	C	25	B	13	A	9	D	36	80
2000	5	C	21	C	25	C	25	C	25	B	13	A	9	D	36	80
2005	6	C	26	D	31	D	32	C	25	B	16	B	10	D	49	80
2005	7	C	24	C	33	C	33	C	25	B	14	B	10	D	35	80
2005	8	C	25	C	33	C	33	C	25	B	13	B	10	D	45	80
2005	9	C	26	C	37	D	38	C	25	B	14	B	10	D	43	80
2005	10	C	23	C	30	C	31	C	25	B	13	B	10	D	36	80
2005	11	C	23	C	30	C	31	C	25	B	13	B	10	D	36	80

Table 4. LOS Analysis Results for US 7 & Flynn

Year	Scenario	Overall Intersection		US 7 Southbound				Odell Ave WB		US 7 Northbound				Home Ave EB		Cycle Length
				Approach		Through		Approach		Approach		Through		Approach		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
2000	1	D+	38	D	39	D	39	C	30	C	34	C	34	E+	53	80
2000	2	D+	38	D	43	D+	43	C	35	C	32	C+	26	D	50	80
2000	3	C	33	C	32	C	30	D+	35	C	33	C	32	D+	42	90
2000	4	D+	39	D+	38	D+	38	C	30	D+	39	D+	36	D+	42	90
2000	5	C	33	C	32	C	31	D+	39	C	33	C+	30	D+	37	90
2005	6	E+	62	D	56	D	44	E+	52	E	63	E	68	E+	99	80
2005	7	D+	37	C+	25	C+	23	D	53	D	44	D	43	C	31	80
2005	8	D+	44	C	40	C	40	D	53	D	47	D	46	C	35	90
2005	9	D+	45	C	36	C+	26	D	56	E+	52	E+	53	C	35	80
2005	10	D+	39	C+	26	C+	23	D	53	D	48	D	47	C	35	90
2005	11	D+	38	C+	28	C+	28	D+	43	D	45	D	44	C	31	80

Table 5. LOS Analysis Results for US 7 & Home

Year	Scenario	Overall Intersection		US 7 Southbound				Mall 189 WB		US 7 Northbound				Price Chopper EB		Cycle Length
				Approach		Through		Approach		Approach		Through		Approach		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
2000	1	D+	37	C	29	C	29	E+	71	D+	38	D+	35	D+	44	80
2000	2	D	46	D	51	D	51	D	55	D+	40	D+	40	D+	44	90
2000	3	D+	39	D	42	D	42	D	50	D+	36	D+	36	D+	40	80
2000	4	D+	42	D+	37	D+	37	D	52	D	46	D	45	D+	41	90
2000	5	D+	39	D+	39	D+	39	D	48	D+	37	D+	37	D+	39	80
2005	6	C	35	D	50	D	50	D+	47	B+	16	A	14	D	59	90
2005	7	C	33	C+	28	C+	28	D+	45	D+	36	D+	35	C	34	80
2005	8	D+	42	D+	40	D+	40	D	49	D+	42	D+	41	D+	38	90
2005	9	D+	36	C	36	C	36	D+	44	D+	35	D+	34	C	34	80
2005	10	D+	37	C+	27	C+	27	D	49	D+	42	D+	41	D+	38	90
2005	11	C	34	C	31	C	31	D+	44	D+	35	D+	34	C	34	80

Table 6. LOS Analysis Results for US 7 &

Year	Scenario	Overall Intersection		US 7 Southbound				I-189 WB		US 7 Northbound						Cycle Length
				Approach		Through		Approach		Approach		Through		Approach		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
2000	1	C	27	D+	34	D+	34	B	18	C+	23	C+	23			80
2000	2	C+	25	C+	26	C+	26	C	30	B	20	B	20			80
2000	3	C	28	D+	37	D+	37	B	18	C+	22	C+	22			80
2000	4	C	30	D+	36	D+	36	B	18	C	30	C	30			80
2000	5	C	27	D+	34	D+	34	B	18	C+	22	C+	22			80
2005	6	D+	35	D	48	D	48	B	19	C+	27	C+	27			80
2005	7	C+	23	C+	26	C+	26	B+	15	C+	24	C+	24			80
2005	8	C	31	D+	34	D+	34	B+	15	D+	34	D+	34			80
2005	9	C+	24	C+	28	C+	28	B+	15	C+	24	C+	24			80
2005	10	C	27	C+	27	C+	27	B+	15	D+	33	D+	33			80
2005	11	C+	24	C+	27	C+	27	B+	15	C+	24	C+	24			80

Table 7. LOS Analysis Results for US

Year	Scenario	Overall Intersection		US 7 Southbound				Swift Street WB		US 7 Northbound						Cycle Length
				Approach		Through		Approach		Approach		Through		Approach		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
2000	1	B	18	A	12	A	7	E+	54	B+	15	B+	15			80
2000	2	C+	23	A	14	A	9	C	31	C	30	C	30			80
2000	3	B+	16	A	9	A	7	D	47	B+	15	B+	15			80
2000	4	C+	23	A	13	A	11	C	29	C	29	C	29			80
2000	5	B+	16	A	9	A	7	D	46	B+	15	B+	15			80
2005	6	B	21	A	14	A	7	E	67	B+	15	B+	15			80
2005	7	C+	23	A	12	A	8	C+	24	C	32	C	32			80
2005	8	C	31	B+	18	A	7	C	32	D	42	D	42			80
2005	9	C+	23	C+	19	A	5	D	68	B+	14	B+	14			80
2005	10	C+	22	A	12	A	8	C	34	C+	26	C+	26			80
2005	11	C+	24	A	12	A	8	C+	24	C	34	C	34			80

Table 8. LOS Analysis Results for US 7 &

Year	Scenario	Overall Intersection		Farrell Street Southbound		Swift Street Westbound		Farrell Street Northbound		Swift Street Eastbound		Cycle Length
				Approach		Approach		Approach		Approach		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
2000	1	B	21	C+	25	B+	15	B	17	C+	23	60
2000	2	C+	22	C+	24	B+	14	B	17	C+	27	60
2000	3	B	20	C	33	B+	15	B	17	B+	15	60
2000	4	B	18	C+	25	B+	14	B	17	B	16	60
2000	5	B	20	C	32	B+	14	B	17	B+	15	60
2005	6	C	31	D+	43	B+	15	B	18	D+	32	60
2005	7	C+	29	C	38	B+	14	B	18	C	33	60
2005	8	D+	40	D	65	B+	16	C+	21	D	41	80
2005	9	C+	22	C+	26	B+	16	B	17	C+	24	60
2005	10	C+	27	C	29	B+	16	B	16	C	34	60
2005	11	C+	24	C+	26	B	18	B	16	C+	28	60

Table 9. LOS Analysis Results for Swift Street & Farrell

Year	Scenario	Overall Intersection		Spear Street Southbound		Swift Street Westbound		Spear Street Northbound		Swift Street Eastbound		Cycle Length
				Approach		Approach		Approach		Approach		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
2000	1	B	17	B	17	B	17	B	19	B	17	72
2000	2	B	17	B+	12	B	20	B	17	B	19	60
2000	3	B	17	B+	12	B	20	B	18	B	19	60
2000	4	B	21	B	17	B	17	C	34	B	17	72
2000	5	B	17	B+	12	B	20	B	18	B	19	60
2005	6	B	17	B+	12	B	20	B	18	B	20	60
2005	7	B	18	B+	11	B	21	B	19	C+	22	60
2005	8	B	17	B+	11	B	21	B	17	C+	22	60
2005	9	B	18	B+	11	B	21	B	18	C+	22	60
2005	10	B	21	B	17	B	17	C	34	B	17	72
2005	11	B	18	B+	11	B	21	B	18	C+	22	60

Table 10. LOS Analysis Results for Swift Street & Spear Street

Queue Analysis

The LOS analyses above assume that there is adequate storage length for vehicles waiting at the intersection. If there is not enough room in the left or right turn lanes, right or left turning vehicles may spill out into other lanes blocking through movements. The tables below compare the available storage lanes to the estimated queue lengths. In many cases, the estimated queue length exceeds the available storage length.

US 7 & Flynn		Southbound Left	Northbound Left	
		Available Storage		
Year	Scenario	150	210	Estimatd Queue (Feet)
2000	1	34	48	
2000	2	34	87	
2000	3	34	188	
2000	4	34	87	
2000	5	34	74	
2005	6	36	137	
2005	7	37	89	
2005	8	37	79	
2005	9	36	85	
2005	10	37	79	
2005	11	37	68	

US 7 & Home		Southbound Left	Northbound Left	
		Available Storage		
Year	Scenario	165	150	Estimatd Queue (Feet)
2000	1	75	255	
2000	2	86	318	
2000	3	229	193	
2000	4	86	304	
2000	5	71	265	
2005	6	209	174	
2005	7	180	156	
2005	8	196	186	
2005	9	196	186	
2005	10	329	89	
2005	11	329	89	

US 7 & Mall 189		Southbound Left	Northbound Left	
		Available Storage		
Year	Scenario	135	150	Estimatd Queue (Feet)
2000	1	39	190	
2000	2	34	212	
2000	3	30	107	
2000	4	34	146	
2000	5	30	104	
2005	6	25	81	
2005	7	36	130	
2005	8	37	152	
2005	9	35	202	
2005	10	40	152	
2005	11	35	129	

US 7 & Swift St.		Southbound Left	
		Available	
Year	Scenario	150	Estimatd Queue (Feet)
2000	1	164	
2000	2	245	
2000	3	118	
2000	4	156	
2000	5	116	
2005	6	174	
2005	7	205	
2005	8	333	
2005	9	376	
2005	10	210	
2005	11	185	

Table 11. Queue Analysis

The results of the LOS and queue analyses are summarized in **Tables 12 and 13** on the following pages. These tables compare each signalized intersection among the eleven scenarios. An “OK” indicates that the intersection can operate at acceptable Levels of Service. A brief description follows indicating changes, such as traffic signal timing adjustments, which may be necessary to maintain acceptable levels of service. Also shown is whether or nor spill over from left turn lanes is anticipated.

The one intersection with potential capacity problems is the Home Avenue / US 7 intersection. The LOS analyses completed above assume an additional lane on the O’dell Parkway approach.

Scenarios	*1*	*2*	*3*	*4*	*5*	*6*
	Base Network	***Existing***	***Existing***	***Existing***	***Existing***	***Existing***
	Farrell St	***Existing***	***Dead End***	***Dead End***	***One-Way SB***	***One-Way SB***
	O'dell	***No***	***No***	***Through***	***No***	***Through***
Intersections	US 7 / Flynn	**OK**	**OK**	**OK**	**OK**	**OK**
	US 7 / Home	**OK**	Increase cycle length from 80 to 90 sec.	Revise cycle length and timings. **Left Turn Lane Spillover.**	Increase cycle length from 80 to 90 sec. **Left Turn Lane Spillover.**	Increase cycle length from 80 to 90 sec. **Left Turn Lane Spillover.**
	US 7 / Plaza	**OK** **Left Turn Lane Spillover.**	Allow permissive lefts on northbound US 7. **Left Turn Lane Spillover.**	Allow permissive lefts on northbound US 7.	Increase cycle length from 80 to 90 sec. **Left Turn Lane Spillover.**	Allow permissive lefts on northbound US 7.
	US 7 / I-189	**OK**	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.
	US 7 / Swift	**OK** as is but better with minor adjustments.	**OK** as is but better with minor adjustments.	**OK** as is but better with minor adjustments.	**OK** with minor timing adjustments.	**OK**
	Swift / Farrell	**OK**	**OK**	**OK**	**OK**	**OK**
	Swift / Spear	**OK**	**OK** as is but better with minor adjustments. **Left Turn Lane Spillover.**	**OK** as is but better with minor adjustments.	**OK** as is but better with minor adjustments.	**OK** as is but better with minor adjustments.

Table 12. Summary of Performance at Signalized Intersections in 2000.

Scenarios		6	7	8	9	10	11	
		Base Network	***Existing***	***Committed***	***Committed***	***Committed***	***Committed***	***Committed***
		Farrell St	***Existing***	***Existing***	***Dead End***	***Dead End***	***One-Way SB***	***One-Way SB***
		O'dell	***No***	***No***	***No***	***Through***	***No***	***Through***
Intersections	US 7 / Flynn	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**
	US 7 / Home	Operates at LOS E. Consider additional lanes. **Left Turn Lane Spillover.**	**OK** with minor timing adjustments. **Left Turn Lane Spillover.**	Increase cycle length from 80 to 90 sec.. **Left Turn Lane Spillover.**	Consider additional turn lane on O'dell. **Left Turn Lane Spillover.**	Increase cycle length from 80 to 90 sec.. **Left Turn Lane Spillover.**	Consider additional turn lane on O'dell. **Left Turn Lane Spillover.**
	US 7 / 189 Plaza	Operates at LOS E. Different phase plan can produce LOS C.	**OK** with minor timing adjustments.	Increase cycle length from 80 to 90 sec..	**OK** with minor timing adjustments. **Left Turn Lane Spillover.**	Increase cycle length from 80 to 90 sec..	**OK** with minor timing adjustments.
	US 7 / I-189	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.
	US 7 / Swift	**OK** as is but better with minor adjustments	**OK**	**OK** with minor timing adjustments.	**OK** with minor timing adjustments.	**OK** with minor timing adjustments	**OK** with minor timing adjustments
	Swift / Farrell	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**
	Swift / Spear	**OK** as is but better with minor adjustments. **Left Turn Lane Spillover.**	**OK** as is but better with minor adjustments. **Left Turn Lane Spillover.**	**OK** as is but better with minor adjustments. **Left Turn Lane Spillover.**	**OK** as is but better with minor adjustments. **Left Turn Lane Spillover.**	**OK** as is but better with minor adjustments. **Left Turn Lane Spillover.**	**OK** as is but better with minor adjustments. **Left Turn Lane Spillover.**

Table 13. Summary of Performance at Signalized Intersections in 2000

ANALYSIS OF STOP CONTROLLED INTERSECTIONS

The tables below provide the LOS results for the stop controlled intersections of US 7 with Proctor Avenue and US 7 with Hadley Road. Overall LOS is not provided for stop controlled intersections. Rather, LOS is only provided for the critical movements. The tables indicate that vehicles turning left into Proctor Avenue will experience average delays while vehicles turning left into Hadley Ave will experience only short delays. However, extreme delays will be experienced when turning out of either street onto US 7. Delays for vehicles exiting either street become worse for all scenarios.

Year	Scenario	US 7 Left		Proctor Left		Proctor Approach	
		LOS	Delay	LOS	Delay	LOS	Delay
2000	1	C	20	F	2978	F	2978
2000	2	C	21	F	22,160	F	22,160
2000	3	C	22	F	22,960	F	22,962
2000	4	C	22	F	8,829	F	8,829
2005	5	C	22	F	2,237	F	2,237
2005	6	D	25	F	28,308	F	28,308
2005	7	C	17	F	2,158	F	2,158
2005	8	C	18	F	6,690	F	6,690
2005	9	C	18	F	7,343	F	7,343
2005	10	C	18	F	4,949	F	4,949
2005	11	C	18	F	6,107	F	6,107

Table 14. LOS Results at the US 7 / Proctor Avenue Intersection

Year	Scenario	US 7 Left		Hadley Left		Proctor Approach	
		LOS	Delay	LOS	Delay	LOS	Delay
2000	1	B	14	E	47	E	47
2000	2	B	13	F	100	F	100
2000	3	B	13	F	100	F	100
2000	4	B	15	F	112	F	112
2005	5	B	15	F	95	F	95
2005	6	B	15	F	530	F	530
2005	7	B	12	F	118	F	118
2005	8	B	12	F	86	F	86
2005	9	B	12	F	90	F	90
2005	10	B	13	F	100	F	100
2005	11	B	14	F	100	F	100

Table 15. LOS Results at the US 7 / Hadley Road Intersection

FINDINGS

Effectiveness of Alternatives on Neighborhood Traffic

- The Dead End alternative is projected to reduce neighborhood through traffic by about 85% and total neighborhood traffic by approximately 65% with or without O'dell Parkway.

- The One-way Southbound alternative is projected to reduce neighborhood through traffic by approximately 45% and total neighborhood traffic by approximately 33% with or without O'dell Parkway.

- The Southern Connector is projected to reduce neighborhood through traffic by 7% and total neighborhood traffic by 6%.

Effect on nearby Shelburne Road and Swift Street intersections (Refer to Tables 13 and 14 on pages 9 and 10).

- In 2000, all the alternatives can be accommodated by the traffic signals along Shelburne Road with minor timing adjustments. However, lane blocking may occur during the peak traffic periods, especially at the Home Avenue, Shelburne Plaza and Swift Street intersections with US 7.

- In 2005, potential capacity problems are projected at the US 7 / Home Avenue intersection for the scenarios in which the O'dell Parkway is combined with the Farrell Street Dead End or the Farrell Street One-Way Southbound alternatives. This finding also assumes the completion of the Southern Connector. An additional turn lane on O'dell Parkway (for a total of two right turn lanes and one left turn lane) is an option that would eliminate this deficiency. Lane blocking will be a problem for all 2005 scenarios.

- In 2005, lane blocking from southbound left turners is projected for all scenarios at the US 7 / Swift Street intersection . However, there is room to extend the southbound left turn lane.

- In 2005, all other intersections studied can accommodate the proposed development assumed in this analysis and either the Farrell Street Dead End or Farrell Street One-Way Southbound alternatives with timing adjustments.

- In order to achieve acceptable levels of service while accommodating anticipated development and either of the Farrell Street alternatives, the Southern Connector must be open by 2005.

Access to and From The Proctor / Hadley / Meadow Neighborhood

- Left turns from US 7 into Proctor Ave. or Hadley Road are not significantly affected by any of the scenarios. However, blocking of southbound US 7 traffic by vehicles waiting to turn into Proctor will continue to be a problem.

- In 2000, with the Farrell Street Dead End alternatives, delays will increase substantially (about seven times longer than current delays) for left turns out of Proctor Ave. and Hadley Road onto US 7.

- In 2005, with the Farrell Street One-Way Southbound alternatives, delay increase by a factor of three for left turns from Proctor Ave. and Hadley Road onto US 7.

- In 2005, delays for left turns from Proctor and Hadley onto US 7 would be 5 to 6 times longer without the Southern Connector.

- In terms of overall access, the Dead End Alternatives remove one potential ingress and egress to the neighborhood. Residents will loose the ability to make protected left turns from the US 7 / Swift Street intersection.