

HCM Unsignalized Intersection Capacity Analysis
 2: Tyne Boulevard & Lealand Lane

Oak Hill Traffic Study
 AM Existing Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	98	241	5	15	309	124	7	71	41	45	20	77
Peak Hour Factor	0.82	0.94	0.63	0.47	0.89	0.53	0.58	0.71	0.68	0.63	0.63	0.53
Hourly flow rate (vph)	120	256	8	32	347	234	12	100	60	71	32	145

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	384	613	172	248
Volume Left (vph)	120	32	12	71
Volume Right (vph)	8	234	60	145
Hadj (s)	0.08	-0.18	-0.16	-0.26
Departure Headway (s)	6.8	6.2	7.6	7.2
Degree Utilization, x	0.72	1.06	0.36	0.50
Capacity (veh/h)	514	569	431	470
Control Delay (s)	25.7	80.2	14.8	17.0
Approach Delay (s)	25.7	80.2	14.8	17.0
Approach LOS	D	F	B	C

Intersection Summary			
Delay		46.4	
HCM Level of Service		E	
Intersection Capacity Utilization	68.0%		ICU Level of Service C
Analysis Period (min)		15	

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	107	7	21	78	26	6	12	7	26	5	24
Peak Hour Factor	0.58	0.84	0.35	0.58	0.72	0.65	0.50	0.75	0.58	0.72	0.63	0.67
Hourly flow rate (vph)	24	127	20	36	108	40	12	16	12	36	8	36

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	172	185	40	80
Volume Left (vph)	24	36	12	36
Volume Right (vph)	20	40	12	36
Hadj (s)	-0.01	-0.06	-0.09	-0.14
Departure Headway (s)	4.4	4.3	4.7	4.6
Degree Utilization, x	0.21	0.22	0.05	0.10
Capacity (veh/h)	792	796	699	716
Control Delay (s)	8.5	8.6	8.0	8.1
Approach Delay (s)	8.5	8.6	8.0	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay		8.4	
HCM Level of Service		A	
Intersection Capacity Utilization	23.1%		ICU Level of Service A
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	278	1	11	214	38	1	20	30	157	20	63
Peak Hour Factor	0.63	0.78	0.25	0.69	0.86	0.73	0.25	0.42	0.58	0.96	0.83	0.83
Hourly flow rate (vph)	48	356	4	16	249	52	4	48	52	164	24	76

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	408	317	103	264
Volume Left (vph)	48	16	4	164
Volume Right (vph)	4	52	52	76
Hadj (s)	0.05	-0.05	-0.26	-0.01
Departure Headway (s)	5.7	5.8	6.4	6.2
Degree Utilization, x	0.65	0.51	0.18	0.45
Capacity (veh/h)	601	574	447	527
Control Delay (s)	18.7	14.7	10.8	14.3
Approach Delay (s)	18.7	14.7	10.8	14.3
Approach LOS	C	B	B	B

Intersection Summary			
Delay		15.7	
HCM Level of Service		C	
Intersection Capacity Utilization	53.3%		ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
3: Tyne Boulevard & Franklin Pike

Oak Hill Traffic Study
AM Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕	↗	↘	↗	↘		↕	↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0			4.0		
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00			0.95		
Flt		0.92			1.00	0.85	1.00	1.00			0.98		
Flt Protected		0.98			0.96	1.00	0.95	1.00			1.00		
Satd. Flow (prot)		1686			1786	1583	1770	1863			3457		
Flt Permitted		0.98			0.96	1.00	0.21	1.00			1.00		
Satd. Flow (perm)		1686			1786	1583	385	1863			3457		
Volume (vph)	172	1	133	7	1	1	409	840	0	0	406	77	
Peak-hour factor, PHF	0.91	0.25	0.55	0.29	0.25	0.25	0.97	0.87	1.00	1.00	0.66	0.69	
Adj. Flow (vph)	189	4	242	24	4	4	422	966	0	0	615	112	
RTOR Reduction (vph)	0	59	0	0	0	4	0	0	0	0	19	0	
Lane Group Flow (vph)	0	376	0	0	28	0	422	966	0	0	708	0	
Turn Type	Split		Split		Perm pm+pt			Perm					
Protected Phases	4	4	3		3	1		6				2	
Permitted Phases					3		6					2	
Actuated Green, G (s)	14.1				2.5	2.5	37.8	37.8				21.6	
Effective Green, g (s)	15.1				3.5	3.5	40.3	40.3				24.1	
Actuated g/C Ratio	0.21				0.05	0.05	0.57	0.57				0.34	
Clearance Time (s)	5.0				5.0	5.0	5.5	6.5				6.5	
Vehicle Extension (s)	4.0				4.0	4.0	2.0	2.0				2.0	
Lane Grp Cap (vph)	359				88	78	457	1059				1175	
v/s Ratio Prot	c0.22				c0.02		0.16	c0.52				0.20	
v/s Ratio Perm						0.00	c0.37						
v/c Ratio	1.05				0.32	0.00	0.92	0.91				0.60	
Uniform Delay, d1	27.9				32.5	32.0	12.9	13.7				19.4	
Progression Factor	1.00				1.00	1.00	1.00	1.00				1.00	
Incremental Delay, d2	60.4				2.8	0.0	24.0	13.2				2.3	
Delay (s)	88.3				35.4	32.1	36.8	26.9				21.7	
Level of Service	F				D	C	D	C				C	
Approach Delay (s)	88.3				35.0			29.9					21.7
Approach LOS	F				C			C					C
Intersection Summary													
HCM Average Control Delay	37.5				HCM Level of Service				D				
HCM Volume to Capacity ratio	0.92												
Actuated Cycle Length (s)	70.9				Sum of lost time (s)				12.0				
Intersection Capacity Utilization	95.3%				ICU Level of Service				F				
Analysis Period (min)	15												
c Critical Lane Group													

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Lane Configurations		↕			↕	↗	↘	↕			↕		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0			4.0		
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00			0.95		
Frt		0.93			1.00	0.85	1.00	1.00			0.97		
Flt Protected		0.98			0.95	1.00	0.95	1.00			1.00		
Satd. Flow (prot)		1688			1770	1583	1770	1860			3432		
Flt Permitted		0.98			0.95	1.00	0.40	1.00			1.00		
Satd. Flow (perm)		1688			1770	1583	738	1860			3432		
Volume (vph)	66	2	93	2	0	1	66	348	2	0	372	69	
Peak-hour factor, PHF	0.79	0.50	0.86	0.50	1.00	0.25	0.79	0.91	0.50	1.00	0.94	0.69	
Adj. Flow (vph)	84	4	108	4	0	4	84	382	4	0	396	100	
RTOR Reduction (vph)	0	61	0	0	0	4	0	0	0	0	23	0	
Lane Group Flow (vph)	0	135	0	0	4	0	84	386	0	0	473	0	
Turn Type	Split		Split		Perm pm+pt			Perm					
Protected Phases	4	4		3	3		1	6				2	
Permitted Phases						3	6			2			
Actuated Green, G (s)		10.7			1.3	1.3	45.7	45.7				34.0	
Effective Green, g (s)		11.7			2.3	2.3	48.2	48.2				36.5	
Actuated g/C Ratio		0.16			0.03	0.03	0.65	0.65				0.49	
Clearance Time (s)		5.0			5.0	5.0	5.5	6.5				6.5	
Vehicle Extension (s)		4.0			4.0	4.0	2.0	2.0				2.0	
Lane Grp Cap (vph)		266			55	49	586	1208				1688	
v/s Ratio Prot		c0.08			c0.00		0.01	c0.21				0.14	
v/s Ratio Perm						0.00	0.08						
v/c Ratio		0.51			0.07	0.00	0.14	0.32				0.28	
Uniform Delay, d1		28.6			34.9	34.8	5.1	5.7				11.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00				1.00	
Incremental Delay, d2		2.1			0.8	0.0	0.0	0.7				0.4	
Delay (s)		30.7			35.7	34.9	5.1	6.4				11.5	
Level of Service		C			D	C	A	A				B	
Approach Delay (s)		30.7			35.3			6.2				11.5	
Approach LOS		C			D			A				B	
Intersection Summary													
HCM Average Control Delay			12.8									HCM Level of Service	B
HCM Volume to Capacity ratio			0.35										
Actuated Cycle Length (s)			74.2									Sum of lost time (s)	12.0
Intersection Capacity Utilization			61.2%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													