





















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

Oak Hill Traffic Study
 PM 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	
Lane Util. Factor		1.00			1.00		1.00	1.00			0.95	
Flt		0.92			1.00		1.00	1.00			0.97	
Flt Protected		0.98			0.95		0.95	1.00			1.00	
Satd. Flow (prot)		1684			1770		1770	1863			3450	
Flt Permitted		0.98			0.95		0.12	1.00			1.00	
Satd. Flow (perm)		1684			1770		227	1863			3450	
Volume (vph)	188	4	318	2	0	0	123	467	0	0	861	147
Peak-hour factor, PHF	0.82	0.33	0.96	0.50	1.00	1.00	0.90	0.90	1.00	1.00	0.87	0.74
Adj. Flow (vph)	229	12	331	4	0	0	137	519	0	0	990	199
RTOR Reduction (vph)	0	61	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	511	0	0	4	0	137	519	0	0	1170	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)	18.1				1.2		39.8		39.8		26.3	
Effective Green, g (s)	19.1				2.2		42.3		42.3		28.8	
Actuated g/C Ratio	0.25				0.03		0.56		0.56		0.38	
Clearance Time (s)	5.0				5.0		5.5		6.5		6.5	
Vehicle Extension (s)	4.0				4.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	425				52		321		1042		1314	
v/s Ratio Prot	c0.30				c0.00		0.05		c0.28		c0.34	
v/s Ratio Perm							0.19					
v/c Ratio	1.20				0.08		0.43		0.50		0.89	
Uniform Delay, d1	28.2				35.7		12.8		10.2		21.9	
Progression Factor	1.00				1.00		1.00		1.00		1.00	
Incremental Delay, d2	112.0				0.9		0.3		1.7		9.3	
Delay (s)	140.3				36.6		13.1		11.9		31.3	
Level of Service	F				D		B		B		C	
Approach Delay (s)	140.3				36.6				12.1		31.3	
Approach LOS	F				D				B		C	
Intersection Summary												
HCM Average Control Delay	51.8		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	75.6		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	99.9%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

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

Oak Hill Traffic Study
AM Proposed 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				4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00				0.95
Fr _t		1.00	0.85		1.00	0.85	1.00	1.00				0.98
Fl _t Protected		0.95	1.00		0.96	1.00	0.95	1.00				1.00
Satd. Flow (prot)		1776	1583		1786	1583	1770	1863				3457
Fl _t Permitted		0.95	1.00		0.96	1.00	0.23	1.00				1.00
Satd. Flow (perm)		1776	1583		1786	1583	435	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	0	208	0	0	4	0	0	0	0	18	0
Lane Group Flow (vph)	0	193	34	0	28	0	422	966	0	0	709	0
Turn Type	Split		Perm	Split		Perm	pm+pt				Perm	
Protected Phases	4	4		3	3		1	6				2
Permitted Phases			4			3	6			2		
Actuated Green, G (s)		9.1	9.1		2.5	2.5	42.8	42.8				24.7
Effective Green, g (s)		10.1	10.1		3.5	3.5	45.3	45.3				27.2
Actuated g/C Ratio		0.14	0.14		0.05	0.05	0.64	0.64				0.38
Clearance Time (s)		5.0	5.0		5.0	5.0	5.5	6.5				6.5
Vehicle Extension (s)		4.0	4.0		4.0	4.0	2.0	2.0				2.0
Lane Grp Cap (vph)		253	226		88	78	543	1190				1326
v/s Ratio Prot		c0.11			c0.02		0.15	c0.52				0.21
v/s Ratio Perm			0.02			0.00	0.34					
v/c Ratio		0.76	0.15		0.32	0.00	0.78	0.81				0.53
Uniform Delay, d1		29.2	26.6		32.5	32.0	8.5	9.6				16.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2		13.5	0.4		2.8	0.0	6.3	6.1				1.5
Delay (s)		42.7	27.1		35.4	32.1	14.9	15.7				18.5
Level of Service		D	C		D	C	B	B				B
Approach Delay (s)		34.0			35.0			15.4				18.5
Approach LOS		C			C			B				B
Intersection Summary												
HCM Average Control Delay		19.7		HCM Level of Service				B				
HCM Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		70.9		Sum of lost time (s)				12.0				
Intersection Capacity Utilization		87.1%		ICU Level of Service				E				
Analysis Period (min)		15										
c Critical Lane Group												

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

Oak Hill Traffic Study
 MD Proposed 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			4.0		
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			0.95		
Fr _t		1.00	0.85		1.00	0.85	1.00	1.00			0.97		
Fl _t Protected		0.95	1.00		0.95	1.00	0.95	1.00			1.00		
Satd. Flow (prot)		1778	1583		1770	1583	1770	1860			3432		
Fl _t Permitted		0.95	1.00		0.95	1.00	0.41	1.00			1.00		
Satd. Flow (perm)		1778	1583		1770	1583	763	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	0	95	0	0	4	0	0	0	0	20	0	
Lane Group Flow (vph)	0	88	13	0	4	0	84	386	0	0	476	0	
Turn Type	Split		Perm	Split		Perm	pm+pt				Perm		
Protected Phases	4	4		3	3		1	6				2	
Permitted Phases			4			3	6				2		
Actuated Green, G (s)		8.6	8.6		1.5	1.5	53.8	53.8			41.3		
Effective Green, g (s)		9.6	9.6		2.5	2.5	56.3	56.3			43.8		
Actuated g/C Ratio		0.12	0.12		0.03	0.03	0.70	0.70			0.54		
Clearance Time (s)		5.0	5.0		5.0	5.0	5.5	6.5			6.5		
Vehicle Extension (s)		4.0	4.0		4.0	4.0	2.0	2.0			2.0		
Lane Grp Cap (vph)		212	189		55	49	641	1302			1870		
v/s Ratio Prot		c0.05			c0.00		0.01	c0.21			0.14		
v/s Ratio Perm			0.01			0.00	0.08						
v/c Ratio		0.42	0.07		0.07	0.00	0.13	0.30			0.25		
Uniform Delay, d ₁		32.8	31.4		37.8	37.7	4.1	4.6			9.7		
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00		
Incremental Delay, d ₂		1.8	0.2		0.8	0.0	0.0	0.6			0.3		
Delay (s)		34.6	31.6		38.6	37.8	4.1	5.1			10.0		
Level of Service		C	C		D	D	A	A			B		
Approach Delay (s)		33.0			38.2			5.0			10.0		
Approach LOS		C			D			A			B		
Intersection Summary													
HCM Average Control Delay			12.0									HCM Level of Service	B
HCM Volume to Capacity ratio			0.30										
Actuated Cycle Length (s)			80.4								Sum of lost time (s)	12.0	
Intersection Capacity Utilization			55.5%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

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

Oak Hill Traffic Study
PM Proposed 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		0.95	0.95		1.00		1.00	1.00			0.95	
Fr _t		1.00	0.85		1.00		1.00	1.00			0.97	
Fl _t Protected		0.95	1.00		0.95		0.95	1.00			1.00	
Satd. Flow (prot)		1689	1504		1770		1770	1863			3450	
Fl _t Permitted		0.95	1.00		0.95		0.11	1.00			1.00	
Satd. Flow (perm)		1689	1504		1770		197	1863			3450	
Volume (vph)	188	4	318	2	0	0	123	467	0	0	861	147
Peak-hour factor, PHF	0.82	0.33	0.96	0.50	1.00	1.00	0.90	0.90	1.00	1.00	0.87	0.74
Adj. Flow (vph)	229	12	331	4	0	0	137	519	0	0	990	199
RTOR Reduction (vph)	0	0	271	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	241	60	0	4	0	137	519	0	0	1170	0
Turn Type	Split		Perm	Split		Perm	pm+pt				Perm	
Protected Phases	4	4		3	3		1	6				2
Permitted Phases			4			3	6			2		
Actuated Green, G (s)		12.7	12.7		1.2		44.8	44.8			31.4	
Effective Green, g (s)		13.7	13.7		2.2		47.3	47.3			33.9	
Actuated g/C Ratio		0.18	0.18		0.03		0.63	0.63			0.45	
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)		308	274		52		321	1172			1555	
v/s Ratio Prot		c0.14			c0.00		0.05	c0.28			c0.34	
v/s Ratio Perm			0.04				0.22					
v/c Ratio		0.78	0.22		0.08		0.43	0.44			0.75	
Uniform Delay, d ₁		29.3	26.2		35.5		10.2	7.2			17.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d ₂		12.9	0.6		0.9		0.3	1.2			3.4	
Delay (s)		42.2	26.8		36.4		10.5	8.4			20.6	
Level of Service		D	C		D		B	A			C	
Approach Delay (s)		33.3			36.4			8.8			20.6	
Approach LOS		C			D			A			C	
Intersection Summary												
HCM Average Control Delay			20.4				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			75.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			86.8%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												