

Synchro Studio 8 Overview

By Ioannis Psarros



What is Synchro?

- Software for signal optimization
- Developed by Trafficware
- Optimization can be applied to:
 - Cycle lengths
 - Splits
 - Offsets



Source: http://bikewalklee.blogspot.com



Terminology-1

- Cycle length
 - Cycle length is the total time to complete one sequence of all movements around an intersection
- Split
 - An individual (movement) split is the sum of the green time + yellow interval + red clearance interval for a particular movement
- Actuated Traffic Control
 - Fully-actuated signals have detectors on all of the approaches and semi-actuated signals only have detectors at some of the approaches.



Terminology-2

- Signal Coordination
 - Process to synchronize start of the "green light" along the major corridor so that a group of vehicles can travel together ("platoon") through multiple signals with minimal or no stopping
- Offset
 - Time between start of the "green light" at one intersection and the start of "green light" at another intersection (the offset defines the movement of traffic along the corridor/major road, also referred to as "progression)

THE UNIVERSIT

Screenshot





Buttons





- Ideal Saturated Flow
 - Default value of 1900 veh/hr/ln (HCM 2000)
 - Do not adjust rate for heavy veh, lane widths, etc. as this is done by Synchro

LANE SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)	N	- ***	1
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)	_	2000	_
Link Speed (mph)	_	50	_
Set Arterial Name and Speed	—	EB	—
Travel Time (s)		27.3	_
Ideal Satd. Flow (vphpl)	1900	1900	1900
Lane Width (ft)	12	12	12
Grade (%)	_	0	—
Area Type CBD	_		—
Storage Length (ft)	400		400
Storage Lanes (#)	1		1
Right Turn Channelized	_		None
Curb Radius (ft)	_		—
Add Lanes (#)	_		—
Lane Utilization Factor	1.00	0.91	1.00
Right Turn Factor	1.000	1.000	0.850
Left Turn Factor (prot)	0.950	1.000	1.000
Saturated Flow Rate (prot)	1805	5187	1615
Left Turn Factor (perm)	0.950	1.000	1.000
Right Ped Bike Factor	1.000	1.000	1.000
Left Ped Factor	1.000	1.000	1.000
Saturated Flow Rate (perm)	1805	5187	1615
Right Turn on Red?	_	_	
Saturated Flow Rate (RTOR)	0	0	118

- CBD (Central Business District)
 - Uses HCM 2000 characteristics for CBD's to make adjustments if selected

LANE SETTINGS	1	→	\mathbf{r}
	EBL	EBT	EBR
Lanes and Sharing (#RL)	٦	<u>- +++</u>	7
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)	—	2000	—
Link Speed (mph)	_	50	—
Set Arterial Name and Speed	_	EB	—
Travel Time (s)		27.3	—
Ideal Satd. Flow (vphpl)	1900	1900	1900
Lane Width (ft)	12	12	12
Grade (%)	_	0	_
Area Type CBD	_		—
Storage Length (ft)	400	—	400
Storage Lanes (#)	1	_	1
Right Turn Channelized	—	—	None
Curb Radius (ft)	_	—	—
Add Lanes (#)	_	—	—
Lane Utilization Factor	1.00	0.91	1.00
Right Turn Factor	1.000	1.000	0.850
Left Turn Factor (prot)	0.950	1.000	1.000
Saturated Flow Rate (prot)	1805	5187	1615
Left Turn Factor (perm)	0.950	1.000	1.000
Right Ped Bike Factor	1.000	1.000	1.000
Left Ped Factor	1.000	1.000	1.000
Saturated Flow Rate (perm)	1805	5187	1615
Right Turn on Red?	_	_	



LANE SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)		i - 1	1
Traffic Volume (vph)	30	0 1200	100
Street Name			
Link Distance (ft)	_	- 2000	—
Link Speed (mph)	_	- 50	—
Set Arterial Name and Speed	_	EB	—
Travel Time (s)	_	- 27.3	—
Ideal Satd. Flow (vphpl)	190	0 1900	1900
Lane Width (ft)	1	2 12	12
Grade (%)	_	- 0	—
Area Tupe CBD		-	
Storage Length (ft)	40	0 —	400
otorago zongar (it)			
Storage Lanes (#)		- 1 —	1
Storage Lanes (#) Right Turn Channelized	-	- 1 — - —	1 None
Storage Lanes (#) Right Turn Channelized Curb Radius (ft)	-	- 1 	1 None
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#)	-	- 1 	1 None —
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor		- 0 0.91	1 None — — 1.00
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor		- 1 — - — - — 0 0.91 0 1.000	1 None — 1.00 0.850
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot)			1 None — 1.00 0.850 1.000
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot)		 0 0.91 0 1.000 0 1.000 5 5187	1 None
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm)			1 None 1.00 0.850 1.000 1615 1.000
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor		 0 0.91 0 1.000 0 1.000 5 5187 0 1.000 0 1.000	1 None
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor Left Ped Factor			1 None 1.00 0.850 1.000 1615 1.000 1.000 1.000
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor Left Ped Factor Saturated Flow Rate (perm)		 0 0.91 0 1.000 0 1.000 5 5187 0 1.000 0 1.000 0 1.000 5 5187	1 None 1.00 0.850 1.000 1615 1.000 1.000 1.000 1.000
Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor Left Ped Factor Saturated Flow Rate (perm) Right Turn on Red?			1 None 1.00 0.850 1.000 1615 1.000 1.000 1.000 1615



LANE SETTINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	5	- +++	۴
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)	_	2000	—
Link Speed (mph)	_	50	—
Set Arterial Name and Speed	—	EB	—
Travel Time (s)	_	27.3	—
Ideal Satd. Flow (vphpl)	1900	1900	1900
Lane Width (ft)	12	12	12
Grade (%)	—	0	—
Area Type CBD	_		—
Character Law alls (6)	400		400
Storage Length (rt)	400		400
Storage Length (rt) Storage Lanes (#)	400	_	400
Storage Length (it) Storage Lanes (#) Right Turn Channelized	400	_	1 None
Storage Length (n) Storage Lanes (#) Right Turn Channelized Curb Radius (ft)	400 1 —	-	1 None
Storage Length (n) Storage Lanes (#) Right Turn Channelized Curb Radius (ft) Add Lanes (#)	400 1 — —		1 None —
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor	400 1 1.00		1 None — — 1.00
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor	400 1 		1 None
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot)	+00 1 1.00 1.000 0.950		1 None 1.00 0.850 1.000
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot)	+00 1 1.00 1.000 0.950 1805		1 None 1.00 0.850 1.000 1615
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm)	+00 1 1.00 1.000 0.950 1805 0.950		1 None 1.00 0.850 1.000 1615 1.000
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor	+00 1 1.00 1.000 0.950 1805 0.950 1.000		1 None 1.00 0.850 1.000 1615 1.000
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor Left Ped Factor	+00 1 1.00 1.000 0.950 1805 0.950 1.000		1 None 1.00 0.850 1.000 1615 1.000 1.000 1.000
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor (prot) Left Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor Left Ped Factor Saturated Flow Rate (perm)	+00 1 1.00 1.000 0.950 1805 0.950 1.000 1.000 1.000		1 None
Storage Length (it) Storage Lanes (#) Right Turn Channelized Curb Radius (it) Add Lanes (#) Lane Utilization Factor Right Turn Factor (prot) Saturated Flow Rate (prot) Left Turn Factor (perm) Right Ped Bike Factor Left Ped Factor Saturated Flow Rate (perm) Right Turn on Red?	+00 1 1.00 1.000 0.950 1805 0.950 1.000 1.000 1.000		1 None 1.00 0.850 1.000 1615 1.000 1.000 1.000 1615



Determines how traffic volumes are distributed across each lane

 f_{LU} Tot. App. Vol. $n \times High$ Lane Vol.

	≯	-+	\mathbf{i}
DAME SET HINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	1	- +++	7
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)		2000	_
Link Speed (mph)		- 50	
Set Arterial Name and Speed		EB	
Travel Time (s)		27.3	_
Ideal Satd. Flow (vphpl)	1900) 1900	1900
Lane Width (ft)	12	2 12	12
Grade (%)		0	—
Area Type CBD			—
Storage Length (ft)	400) —	400
Storage Lanes (#)	-	1 —	1
Right Turn Channelized		·	None
Curb Radius (ft)		· _	_
Add Lanes (#)		·	—
Lane Utilization Factor	1.00	0.91	1.00
Right Turn Factor	1.000	0 1.000	0.850
Left Turn Factor (prot)	0.950	0 1.000	1.000
Saturated Flow Rate (prot)	1805	5 5187	1615
Left Turn Factor (perm)	0.950	0 1.000	1.000
Right Ped Bike Factor	1.000	0 1.000	1.000
Left Ped Factor	1.000	0 1.000	1.000
Saturated Flow Rate (perm)	1805	5 5187	1615
Right Turn on Red?	_		\checkmark
Saturated Flow Rate (RTOR)	() (118

- Exclusive Lane:
 - $f_{RT} = 0.85$
- Shared Lane:
 - $f_{RT} = 1.0 (0.15)P_{RT}$
- Single Lane:
 - $f_{RT} = 1.0 (0.135)P_{RT}$

where P_{RT} = proportion of right turn traffic in lane

LANE SETTINGS	≯		\mathbf{r}
8 # 12 02 11 11 100	EBL	EBT	EBR
Lanes and Sharing (#RL)	1	- <u>+++</u>	1
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)	—	2000	—
Link Speed (mph)	—	50	_
Set Arterial Name and Speed	—	EB	—
Travel Time (s)	—	27.3	—
Ideal Satd. Flow (vphpl)	1900	1900	1900
Lane Width (ft)	12	12	12
Grade (%)	—	0	—
Area Type CBD	—		—
Storage Length (ft)	400	—	400
Storage Lanes (#)	1	—	1
Right Turn Channelized	—	—	None
Curb Radius (ft)	—	—	—
Add Lanes (#)	—	—	—
Lane Utilization Factor	1.00	0.91	1.00
Right Turn Factor	1.000	1.000	0.850
Left Turn Factor (prot)	0.950	1.000	1.000
Saturated Flow Rate (prot)	1805	5187	1615
Left Turn Factor (perm)	0.950	1.000	1.000
Right Ped Bike Factor	1.000	1.000	1.000
Left Ped Factor	1.000	1.000	1.000
Saturated Flow Rate (perm)	1805	5187	1615
Right Turn on Red?	_	_	✓
Saturated Flow Rate (RTOR)	0	0	118

- Exclusive Lane:
 - $f_{LT} = 0.95$
- Shared Lane:

•
$$f_{RT} = 1/(1.0 + 0.05P_{LT})$$

where P_{LT} = proportion of left turn traffic in lane

 Permitted left factors are based on actuated green times per the 2000 HCM

LANE SETTINGS	≯	→	\mathbf{i}
DAME SET TINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	۲	- <u>†††</u>	1
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)	—	2000	—
Link Speed (mph)	—	50	—
Set Arterial Name and Speed	—	EB	—
Travel Time (s)	—	27.3	—
Ideal Satd. Flow (vphpl)	1900	1900	1900
Lane Width (ft)	12	12	12
Grade (%)	—	0	—
Area Type CBD	—		—
Storage Length (ft)	400	—	400
Storage Lanes (#)	1	_	1
Right Turn Channelized	—	_	None
Curb Radius (ft)	—	_	—
Add Lanes (#)	—	—	—
Lane Utilization Factor	1.00	0.91	1.00
Right Turn Factor	1.000	1.000	0.850
Left Turn Factor (prot)	0.950	1.000	1.000
Saturated Flow Rate (prot)	1805	5187	1615
Left Turn Factor (perm)	0.950	1.000	1.000
Right Ped Bike Factor	1.000	1.000	1.000
Left Ped Factor	1.000	1.000	1.000
Saturated Flow Rate (perm)	1805	5187	1615
Right Turn on Red?	_	_	
Saturated Flow Rate (RTOR)	0	0	118

- Adjusted flow rates
 - Used in capacity, delay, and optimization calculations
 - Not used for simulation modeling in SimTraffic

	≯	→	\mathbf{N}
DAME SET TINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	۲	- <u>†††</u>	۴
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)	_	2000	—
Link Speed (mph)		50	—
Set Arterial Name and Speed	—	EB	—
Travel Time (s)	_	27.3	—
Ideal Satd. Flow (vphpl)	1900	1900	1900
Lane Width (ft)	12	12	12
Grade (%)	_	0	—
Area Type CBD			—
Storage Length (ft)	400	—	400
Storage Lanes (#)	1	—	1
Right Turn Channelized	_	—	None
Curb Radius (ft)	_	—	—
Add Lanes (#)	_	—	—
Lane Utilization Factor	1.00	0.91	1.00
Right Turn Factor	1.000	1.000	0.850
Left Turn Factor (prot)	0.950	1.000	1.000
Saturated Flow Rate (prot)	1805	5187	1615
Left Turn Factor (perm)	0.950	1.000	1.000
Right Ped Bike Factor	1.000	1.000	1.000
Left Ped Factor	1.000	1.000	1.000
Saturated Flow Rate (perm)	1805	5187	1615
Right Turn on Red?			
Saturated Flow Rate (RTOR)	0	0	118

 These factors are calculated based upon HCM 2000 methods



LANE SETTINGS		→	\mathbf{F}
	EBL	EBT	EBR
Lanes and Sharing (#RL)	1	- <u>†††</u>	1
Traffic Volume (vph)	300	1200	100
Street Name			
Link Distance (ft)	—	2000	—
Link Speed (mph)	—	50	_
Set Arterial Name and Speed	—	EB	—
Travel Time (s)	—	27.3	_
Ideal Satd. Flow (vphpl)	1900	1900	1900
Lane Width (ft)	12	12	12
Grade (%)	—	0	—
Area Type CBD	—		_
Storage Length (ft)	400	—	400
Storage Lanes (#)	1	_	1
Right Turn Channelized	—	—	None
Curb Radius (ft)	—	_	_
Add Lanes (#)	—	—	—
Lane Utilization Factor	1.00	0.91	1.00
Right Turn Factor	1.000	1.000	0.850
Left Turn Factor (prot)	0.950	1.000	1.000
Saturated Flow Rate (prot)	1805	5187	1615
Left Turn Factor (perm)	0.950	1.000	1.000
Right Ped Bike Factor	1.000	1.000	1.000
Left Ped Factor	1.000	1.000	1.000
Saturated Flow Rate (perm)	1805	5187	1615
Right Turn on Red?	—	_	
Saturated Flow Rate (RTOR)	0	0	118

- Right-Turn on Red (ROTR)
 - HCM does not support ROTR calculations
 - Synchro adjusts applies different formulation to calculate ROTR
 - A separate saturation flow rate is calculated for these movements

LANE SETTINGS		→	\rightarrow
DAME SET HINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)		- ^	۳ ·
Traffic Volume (vph)	30	0 1200	100
Street Name			
Link Distance (ft)	_	- 2000	—
Link Speed (mph)	_	- 50	—
Set Arterial Name and Speed	_	EB	—
Travel Time (s)	_	- 27.3	—
Ideal Satd. Flow (vphpl)	190	0 1900	1900
Lane Width (ft)	1:	2 12	: 12
Grade (%)	_	- 0	I —
Area Type CBD	_	-	_
Storage Length (ft)	40	0 —	400
Storage Lanes (#)		1 —	1
Right Turn Channelized		- —	None
Curb Radius (ft)	_	- —	_
Add Lanes (#)		- —	—
Lane Utilization Factor	1.0	0 0.91	1.00
Right Turn Factor	1.00	0 1.000	0.850
Left Turn Factor (prot)	0.95	0 1.000	1.000
Saturated Flow Rate (prot)	180	5 5187	1615
Left Turn Factor (perm)	0.95	0 1.000	1.000
Right Ped Bike Factor	1.00	0 1.000	1.000
Left Ped Factor	1.00	0 1.000	1.000
Saturated Flow Rate (perm)	180	5 5187	1615
Right Turn on Red?	_	- —	
Saturated Flow Rate (RTOR)		0 0	118

$$PHF = \frac{V}{4 \times V_{15}}$$

 $GF = (1+r)^Y$

where r = growth rate Y = number of years

VOLUME SETTINGS	≯	→	\rightarrow
	EBL	EBT	EBR
Lanes and Sharing (#RL)	٦	▼ ↑↑↑	7
Traffic Volume (vph)	j 300	1200	100
Conflicting Peds. (#/hr)	0	—	0
Conflicting Bicycles (#/hr)	—	_	0
Peak Hour Factor	0.85	0.85	0.85
Growth Factor	1.00	1.00	1.00
Heavy Vehicles (%)	0	0	0
Bus Blockages (#/hr)	0	I 0	0
Adj. Parking Lane?			
Parking Maneuvers (#/hr)	—	—	—
Traffic from mid-block (%)	—	0	—
Link OD Volumes		—	—
Adjusted Flow (vph)	353	1412	118
Traffic in shared lane (%)	_	_	—
Lane Group Flow (vph)	353	1412	118



$F_{bb} = [N - (14.4N_b/3600)]/N$

where:

 F_{bb} = bus blockage factor N = number of lanes N_b = number of buses stopping/hr

VOLUME SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)	7	<u> </u>	7
Traffic Volume (vph)	300	1200	100
Conflicting Peds. (#/hr)	0		0
Conflicting Bicycles (#/hr)	—	—	0
Peak Hour Factor	0.85	0.85	0.85
Growth Factor	1.00	1.00	1.00
	-	-	-
Heavy Vehicles (%)	0	0	0
Heavy Vehicles (%) Bus Blockages (#/hr)	0	0	0 0
Heavy Vehicles (%) Bus Blockages (#/hr) Adj. Parking Lane?		0	0
Heavy Vehicles (%) Bus Blockages (#/hr) Adj. Parking Lane? Parking Maneuvers (#/hr)			0 0
Heavy Vehicles (%) Bus Blockages (#/hr) Adj. Parking Lane? Parking Maneuvers (#/hr) Traffic from mid-block (%)		0	
Heavy Vehicles (%) Bus Blockages (#/hr) Adj. Parking Lane? Parking Maneuvers (#/hr) Traffic from mid-block (%) Link OD Volumes			
Heavy Vehicles (%) Bus Blockages (#/hr) Adj. Parking Lane? Parking Maneuvers (#/hr) Traffic from mid-block (%) Link OD Volumes Adjusted Flow (vph)	0 0 	0 0 	0 0 118
Heavy Vehicles (%) Bus Blockages (#/hr) Adj. Parking Lane? Parking Maneuvers (#/hr) Traffic from mid-block (%) Link OD Volumes Adjusted Flow (vph) Traffic in shared lane (%)	0 0 	0 0 	



- On-Street Parking
 - Check the adjacent parking lane box
 - Estimate number of parking maneuvers



VOLUME SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)		- +++	1
Traffic Volume (vph)	300	1200	100
Conflicting Peds. (#/hr)	0		0
Conflicting Bicycles (#/hr)	—		0
Peak Hour Factor	0.85	0.85	0.85
Growth Factor	1.00	1.00	1.00
Heavy Vehicles (%)	0	0	0
Bus Blockages (#/hr)	0	0	0
Adj. Parking Lane?			
Parking Maneuvers (#/hr)	—		—
I rathc from mid-block (%)	—	U	—
Link OD Volumes	—	—	—
Adjusted Flow (vph)	353	1412	118
Traffic in shared lane (%)	—		_
Lane Group Flow (vph)	353	1412	118



- Sources: driveways, un-modeled streets
- Synchro balances upstream & downstream traffic by adjusting midblock traffic
- Higher values of mid-block traffic reduces the effectiveness of signal optimization

VOLUME SETTINGS	≯		•	\mathbf{i}	
	EBL	EBT		EBR	
Lanes and Sharing (#RL)		<u> </u>	M.		۲
Traffic Volume (vph)	j 30	0 12	200	10)0
Conflicting Peds. (#/hr)		0	_		0
Conflicting Bicycles (#/hr)	-	-			0
Peak Hour Factor	0.8	5 0.	85	0.8	35
Growth Factor	1.0	01.	00	1.0)0
Heavy Vehicles (%)		0	0		0
Bus Blockages (#/hr)		0	0		0
Adj. Parking Lane?					
Parking Maneuvers (#/hr)	-	-	_	_	_
Traffic from mid-block (%)	-	-	0	-	—
Link OD Volumes	-	-	—	-	-
Adjusted Flow (vph)	35	3 14	12	11	18
Traffic in shared lane (%)	-	-	_	-	_
Lane Group Flow (vph)	35	3 14	12	11	18



- Allows for detailed control over O-D movements for adjacent intersections
- Used for:
 - Links less than 300 ft. long
 - Freeway interchange intersections
 - Median of a wide arterial
 - Between nodes of a "dog-legged" intersection ("T" intersections)

VOLUME SETTINGS	-	۶		+		\mathbf{i}	
TOLOME OF THIRDS	E	EBL		EBT		EBR	
Lanes and Sharing (#RL)			۳ -				۲
Traffic Volume (vph)		3	00	120	00	1	00
Conflicting Peds. (#/hr)			0	-	_		0
Conflicting Bicycles (#/hr)		-	_	-	_		0
Peak Hour Factor		0.8	35	0.8	35	0.	85
Growth Factor		1.0	00	1.0	00	1.	00
Heavy Vehicles (%)			0		0		0
Bus Blockages (#/hr)			0		0		0
Adj. Parking Lane?							
Parking Maneuvers (#/hr)		-	_	-	_		_
Traffic from mid-block (%)			_		0		_
Link OD Volumes			_		_		_
Adjusted Flow (vph)		3	53	14	12	1	18
Traffic in shared lane (%)		-	_	-	_		-
Lane Group Flow (vph)		3	53	14	12	1	18

- Pass. Car Equivalents are used to balance lanes
- Values for PCEs:
 - Rights = 1.18
 - Protected Lefts = 1.05
 - Permitted Lefts = 1.05 6.67
 - Perm. Plus Prot. =1.05 1.82

VOLUME SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)	۲	- <u>†††</u>	1
Traffic Volume (vph)	300	1200	100
Conflicting Peds. (#/hr)	0	_	0
Conflicting Bicycles (#/hr)	_	_	0
Peak Hour Factor	0.85	0.85	0.85
Growth Factor	1.00	1.00	1.00
Heavy Vehicles (%)	0	0	0
Bus Blockages (#/hr)	0	0	0
Adj. Parking Lane?			
Parking Maneuvers (#/hr)	_		—
Traffic from mid-block (%)	_	0	
Link OD Volumes	_		—
Adjusted Flow (vph)	353	1412	118
Traffic in shared lane (%)	—	—	—
Lane Group Flow (vph)	353	1412	118

Calculated based on opposing traffic volumes

Node Settings

- Controller Types
 - Pretimed
 - Semi-Actuated-Uncoordinated
 - Actuated-Uncoordinated
 - Actuated-Coordinated
 - Unsignalized
 - Roundabouts

NODE SETTINGS	
Node #	3
Zone:	
×East (ft):	10230
Y North (ft):	10833
Z Elevation (ft):	0
Description	
Control Type	Pretimed
Cycle Length (s):	70.0
Lock Timings:	
Optimize Cycle Length:	Optimize
Optimize Splits:	Optimize
Actuated Cycle(s):	70.0
Natural Cycle(s):	70.0
Max v/c Ratio:	0.97
Intersection Delay (s):	36.0
Intersection LOS:	D
ICU:	0.87
ICU LOS:	E
Offset (s) :	0.0
Referenced to:	Begin of Green
Reference Phase:	6+2 - SBTL NBTL
Master Intersection:	
Yield Point:	Single

Node Settings (Cont.)

- Actuated Cycle Length
 - Average cycle length for an actuated signal
- Natural Cycle Length
 - Shortest cycle length that will give acceptable capacity
 - Cycle length intersection would run at if it was independent of other intersections

	NODE SETTINGS	
	Node #	3
	Zone:	
	×East (ft):	10230
	Y North (ft):	10833
	Z Elevation (ft):	0
	Description	
	Control Type	Pretimed
	Cycle Length (s):	70.0
	Lock Timings:	
	Optimize Cycle Length:	Optimize
_	Optimize Splits:	Optimize
ſ	Actuated Cycle(s):	70.0
	Natural Cycle(s):	70.0
	Max v/c Ratio:	0.97
	Intersection Delay (s):	36.0
	Intersection LOS:	D
	ICU:	0.87
	ICU LOS:	E
	Offset (s) :	0.0
	Referenced to:	Begin of Green
	Reference Phase:	6+2 - SBTL NBTL
	Master Intersection:	
	Yield Point:	Single

Left Turn Types

- Permitted
- Protected
- Permitted & Protected
- Split

Right Turn Types

- Permitted
- Protected
- Permitted & Protected
- Overlap
- Protected & Overlap
- Free
- Custom

TIMING SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)	5	- +++	1
Traffic Volume (vph)	300	1200	100
Turn Type	Prot	—	Perm
Protected Phases	7	4	
Permitted Phases			4
Detector Phases	7	4	4
Switch Phase	0	0	0
Leading Detector (ft)	20	100	20
Trailing Detector (ft)	0	0	0
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	12.0	21.9	21.9
Total Split (s)	20.0	29.3	29.3
Yellow Time (s)	5.0	5.0	5.0
All-Red Time (s)	0.9	0.9	0.9
Lost Time Adjust (s)	0.0	0.0	0.0
Lagging Phase?			
Allow Lead/Lag Optimize?			 Image: A set of the set of the
Recall Mode	Max	Max	Max
Actuated Effct. Green (s)	14.1	23.4	23.4
Actuated g/C Ratio	0.20	0.33	0.33
Volume to Capacity Ratio	0.97	0.81	0.19
Control Delay (s)	71.5	26.0	4.6
Queue Delay (s)	0.0	0.0	0.0
Total Delay (s)	71.5	26.0	4.6
Level of Service	E	C	A
Approach Delay (s)	_	33.2	—
Approach LOS	—	C	_
Queue Length 50th (ft)	152	200	0
Queue Length 95th (ft)	#282	234	27

- Startup lost time minus extension of effective green time
 - Extension of effective green is the time vehicles continue to enter the intersection during yellow
 - Default value is zero

TIMING SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)	5	- +++	1
Traffic Volume (vph)	300	1200	100
Turn Type	Prot	_	Perm
Protected Phases	7	4	
Permitted Phases			4
Detector Phases	7	4	4
Switch Phase	0	0	0
Leading Detector (ft)	20	100	20
Trailing Detector (ft)	0	0	0
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	12.0	21.9	21.9
Total Split (s)	20.0	29.3	29.3
Yellow Time (s)	5.0	5.0	5.0
All-Red Time (s)	0.9	0.9	0.9
Lost Time Adjust (s)	0.0	0.0	0.0
Lagging Phase?			
Allow Lead/Lag Optimize?			
Recall Mode	Max	Max	Max
Actuated Effct, Green (s)	14.1	23.4	23.4
Actuated g/C Ratio	0.20	0.33	0.33
Volume to Capacity Ratio	0.97	0.81	0.19
Control Delay (s)	71.5	26.0	4.6
Queue Delay (s)	0.0	0.0	0.0
Total Delay (s)	71.5	26.0	4.6
Level of Service	E	C	A
Approach Delay (s)	_	33.2	_
Approach LOS		C	_
Queue Length 50th (ft)	152	200	0
Queue Length 95th (ft)	#282	234	27



- Lead/Lag Optimization
 - Change/optimize the sequence of phases included in a cycle

	≯	-	
TIMING SETTINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	5	- +++	7
Traffic Volume (vph)	300	1200	100
Turn Type	Prot	_	Perm
Protected Phases	7	4	
Permitted Phases			4
Detector Phases	7	4	4
Switch Phase	0	0	0
Leading Detector (ft)	20	100	20
Trailing Detector (ft)	0	0	0
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	12.0	21.9	21.9
Total Split (s)	20.0	29.3	29.3
Yellow Time (s)	5.0	5.0	5.0
All-Red Time (s)	0.9	0.9	0.9
All-Red Time (s) Lost Time Adjust (s)	0.9 0.0	0.9 0.0	0.9 0.0
All-Red Time (s) Lost Time Adjust (s) Lagging Phase?	0.9 0.0	0.9 0.0	0.9 0.0
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize?	0.9 0.0 🔽	0.9 0.0 🔽	0.9 0.0 🔽
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode	0.9 0.0 	0.9 0.0 ✓ Max	0.9 0.0 🔽 Max
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effet. Green (s)	0.9 0.0 Max 14.1	0.9 0.0 ✓ Max 23.4	0.9 0.0 ✓ Max 23.4
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Hecall Mode Actuated Effct. Green (s) Actuated g/C Ratio	0.9 0.0 Max 14.1 0.20	0.9 0.0 Max 23.4 0.33	0.9 0.0 V Max 23.4 0.33
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effct. Green (s) Actuated g/C Ratio Volume to Capacity Ratio	0.9 0.0 Max 14.1 0.20 0.97	0.9 0.0 23.4 0.33 0.81	0.9 0.0 23.4 0.33 0.19
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effct. Green (s) Actuated g/C Ratio Volume to Capacity Ratio Control Delay (s)	0.9 0.0 Max 14.1 0.20 0.97 71.5	0.9 0.0 Max 23.4 0.33 0.81 26.0	0.9 0.0 V Max 23.4 0.33 0.19 4.6
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effct. Green (s) Actuated g/C Ratio Volume to Capacity Ratio Control Delay (s) Queue Delay (s)	0.9 0.0 Max 14.1 0.20 0.97 71.5 0.0	0.9 0.0 2.0 Max 23.4 0.33 0.81 26.0 0.0	0.9 0.0 23.4 0.33 0.19 4.6 0.0
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effct. Green (s) Actuated g/C Ratio Volume to Capacity Ratio Control Delay (s) Queue Delay (s)	0.9 0.0 Max 14.1 0.20 0.97 71.5 0.0 71.5	0.9 0.0 2.0 Max 23.4 0.33 0.81 26.0 0.0 26.0	0.9 0.0 Max 23.4 0.33 0.19 4.6 0.0 4.6
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effct. Green (s) Actuated g/C Ratio Volume to Capacity Ratio Control Delay (s) Queue Delay (s) Total Delay (s) Level of Service	0.9 0.0 Max 14.1 0.20 0.97 71.5 0.0 71.5 E	0.9 0.0 Max 23.4 0.33 0.81 26.0 0.0 26.0 C	0.9 0.0 Max 23.4 0.33 0.19 4.6 0.0 4.6 0.0
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effct. Green (s) Actuated g/C Ratio Volume to Capacity Ratio Control Delay (s) Queue Delay (s) Total Delay (s) Level of Service Approach Delay (s)	0.9 0.0 ✓ Max 14.1 0.20 0.97 71.5 0.0 71.5 E	0.9 0.0 Max 23.4 0.33 0.81 26.0 0.0 26.0 C 33.2	0.9 0.0 Max 23.4 0.33 0.19 4.6 0.0 4.6 A
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Hecall Mode Actuated Effct. Green (s) Actuated g/C Ratio Volume to Capacity Ratio Control Delay (s) Queue Delay (s) Total Delay (s) Level of Service Approach Delay (s) Approach LOS	0.9 0.0 Max 14.1 0.20 0.97 71.5 0.0 71.5 E E	0.9 0.0 2.0 0.33 0.81 26.0 0.0 26.0 0.0 26.0 0.0 26.0 0.0 26.0 0.0 26.0 0.0 26.0 0.0 0.0 26.0 0.0 0.0 0.0 0.0 0.0	0.9 0.0 Max 23.4 0.33 0.19 4.6 0.0 4.6 A
All-Red Time (s) Lost Time Adjust (s) Lagging Phase? Allow Lead/Lag Optimize? Recall Mode Actuated Effet. Green (s) Actuated g/C Ratio Volume to Capacity Ratio Control Delay (s) Queue Delay (s) Total Delay (s) Level of Service Approach Delay (s) Queue Length 50th (ft)	0.9 0.0 Max 14.1 0.20 0.97 71.5 0.0 71.5 E — —	0.9 0.0 Max 23.4 0.33 0.81 26.0 0.0 26.0 26.0 C 33.2 C 200	0.9 0.0 23.4 0.33 0.19 4.6 0.0 4.6 A

- Recall Modes
 - No recall phase can be skipped
 - Minimum recall never skip, always service min. initial
 - Maximum recall never skip, always service max. split
 - Pedestrian recall never skip, always service ped. clearance interval
 - Coordinated Min. & Max. used with coordinated signals

			~
TIMING SETTINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	5	- +++	7
Traffic Volume (vph)	300	1200	100
Turn Type	Prot	_	Perm
Protected Phases	7	4	
Permitted Phases			4
Detector Phases	7	4	4
Switch Phase	0	0	0
Leading Detector (ft)	20	100	20
Trailing Detector (ft)	0	0	0
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	12.0	21.9	21.9
Total Split (s)	20.0	29.3	29.3
Yellow Time (s)	5.0	5.0	5.0
All-Red Time (s)	0.9	0.9	0.9
Lost Time Adjust (s)	0.0	0.0	0.0
Lagging Phase?			✓
Allow Lead/Lag Optimize?	Image: A start of the start	\checkmark	✓
Recall Mode	Max	Max	Max
Actuated Effct, Green (s)	14.1	23.4	23.4
Actuated g/C Ratio	0.20	0.33	0.33
Volume to Capacity Ratio	0.97	0.81	0.19
Control Delay (s)	71.5	26.0	4.6
Queue Delay (s)	0.0	0.0	0.0
Total Delay (s)	71.5	26.0	4.6
Level of Service	E	C	A
Approach Delay (s)	—	33.2	_
Approach LOS	_	C	_
Queue Length 50th (ft)	152	200	0
Queue Length 95th (ft)	#282	234	27

 Synchro allows for an all red phase for pedestrians or a hold phase



TIMING SETTINGS	HA PED	HOLD
Lanes and Sharing (#RL)	—	_
Traffic Volume (vph)	— I	
Turn Type	—	
Protected Phases		
Permitted Phases		
Detector Phases	—	
Switch Phase	-	
Leading Detector (ft)	—	
Trailing Detector (ft)	-	
Minimum Initial (s)	—	
Minimum Split (s)	-	
Total Split (s)	—	_
Yellow Time (s)	-	_
All-Red Time (s)	—	_
Lost Time Adjust (s)	-	
Lagging Phase?	—	_
Allow Lead/Lag Optimize?	-	
Recall Mode	—	
Actuated Effct. Green (s)	-	
Actuated g/C Ratio	—	
Volume to Capacity Ratio	-	
Control Delay (s)	—	
Queue Delay (s)	—	
Total Delay (s)	—	
Level of Service	—	
Approach Delay (s)	—	
Approach LOS	—	
Queue Length 50th (ft)	—	
Queue Length 95th (ft)	_	



Timing Settings (Unsignalized)

- Three Sign Control settings
 - Free: traffic doesn't stop
 - Yield: yield sign
 - Stop: stop sign
- Roundabouts are also selected using control type

NODE SETTINGS	
Node #	3
Zone:	
×East (ft):	10230
Y North (ft):	10833
Z Elevation (ft):	0
Description	
Control Type	Unsig
Max v/c Hatio:	3.41
Intersection Delay (s):	—
Intersection LOS:	—
ICU:	0.80
ICU LOS:	D

SIGNING SETTINGS	▶ EBL	→ EBT	EBR
Lanes and Sharing (#RL)	ሻ	<u></u>	1
Traffic Volume (vph)	300	1200	100
Sign Control	_	Yield	—
Median Width (ft)	_	12	—
TWLTL Median	_		_
Right Turn Channelized			None
Critical Gap, tC (s)	_	_	—
Follow Up Time, tF (s)			—
Volume to Capacity Ratio	_		_
Control Delay (s)			_
Level of Service	—	—	—
Queue Length 95th (ft)	_	—	—



- Vehicle extension
 - Amount of time green time is extended when vehicle crosses detector
- Minimum Gap
 - Min time for a following vehicle to cross intersection (refers to the distance between 2 following vehicles)

PHASING SETTINGS	2-NBTL
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Maximum Split (s)	20.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lagging Phase?	—
Allow Lead/Lag Optimize?	_
Vehicle Extension (s)	3.0
Minimum Gap (s)	3.0
Time Before Reduce (s)	0.0
Time To Reduce (s)	0.0
Recall Mode	Max
Pedestrian Phase	
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Dual Entry?	
Inhibit Max?	
90th %ile Green Time (s)	16 cd
70th %ile Green Time (s)	16 cd
50th %ile Green Time (s)	16 cd
30th %ile Green Time (s)	16 cd
10th %ile Green Time (s)	16 cd

- Time Before Reduce
 - Amount of time before gap reduction begins
- Time To Reduce
 - Amount of time to reduce the gap to

PHASING SETTINGS	2-NBTL
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Maximum Split (s)	20.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lagging Phase?	—
Allow Lead/Lag Optimize?	—
Vehicle Extension (s)	3.0
Minimum Gap (s)	3.0
Time Before Reduce (s)	0.0
Time To Reduce (s)	0.0
Recall Mode	Minu
	Max
Pedestrian Phase	
Pedestrian Phase Walk Time (s)	5.0
Pedestrian Phase Walk Time (s) Flash Dont Walk (s)	5.0 11.0
Pedestrian Phase Walk Time (s) Flash Dont Walk (s) Pedestrian Calls (#/hr)	5.0 11.0
Pedestrian Phase Walk Time (s) Flash Dont Walk (s) Pedestrian Calls (#/hr) Dual Entry?	5.0 11.0 V
Pedestrian Phase Walk Time (s) Flash Dont Walk (s) Pedestrian Calls (#/hr) Dual Entry? Inhibit Max?	5.0 11.0 V
Pedestrian Phase Walk Time (s) Flash Dont Walk (s) Pedestrian Calls (#/hr) Dual Entry? Inhibit Max? 90th %ile Green Time (s)	5.0 11.0 V V 16 cd
Pedestrian Phase Walk Time (s) Flash Dont Walk (s) Pedestrian Calls (#/hr) Dual Entry? Inhibit Max? 90th %ile Green Time (s) 70th %ile Green Time (s)	5.0 11.0 0 0 0 0 16 cd 16 cd
Pedestrian Phase Walk Time (s) Flash Dont Walk (s) Pedestrian Calls (#/hr) Dual Entry? Inhibit Max? 90th %ile Green Time (s) 70th %ile Green Time (s) 50th %ile Green Time (s)	5.0 5.0 11.0 V V 16 cd 16 cd 16 cd
Pedestrian Phase Walk Time (s) Flash Dont Walk (s) Pedestrian Calls (#/hr) Dual Entry? Inhibit Max? 90th %ile Green Time (s) 70th %ile Green Time (s) 30th %ile Green Time (s)	5.0 11.0 9 9 16 cd 16 cd 16 cd 16 cd

 Walk times, don't walk times, and number of push button calls/hr are all entered in the phasing

settings



PHASING SETTINGS	2-NBTL
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Maximum Split (s)	20.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lagging Phase?	—
Allow Lead/Lag Optimize?	—
Vehicle Extension (s)	3.0
Minimum Gap (s)	3.0
Time Before Reduce (s)	0.0
Time To Reduce (s)	0.0
Recall Mode	Max
Pedestrian Phase	
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Dual Entry?	
Inhibit Max?	
90th %ile Green Time (s)	16 cd
70th %ile Green Time (s)	16 cd
50th %ile Green Time (s)	16 cd
30th %ile Green Time (s)	16 cd
10th %ile Green Time (s)	16 cd



- Only used for Actuated-Coordinated signals
- When selected, a noncoordinated phase can be extended and not terminated as scheduled

PHASING SETTINGS	2-NBTL
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Maximum Split (s)	20.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lagging Phase?	—
Allow Lead/Lag Optimize?	—
Vehicle Extension (s)	3.0
Minimum Gap (s)	3.0
Time Before Reduce (s)	0.0
Time To Reduce (s)	0.0
Recall Mode	Max
Pedestrian Phase	
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Dual Entra?	
Inhibit Max?	
90th %ile Green Time (s)	16 cd
70th %ile Green Time (s)	16 cd
50th %ile Green Time (s)	16 cd
30th %ile Green Time (s)	16 cd
10th %ile Green Time (s)	16 cd

- Phase Diagram
 - Visualization of phasing
 - Can be adjusted manually

		▲ ø8	
20 s		23 s	
🖌 ø3	→ 04		
13.7 s	29.3 s		



- Affects when vehicles can enter storage lane
- Default value is 25 ft.

SIMULATION SETTINGS			
	EBL	EBI	EBR
Lanes and Sharing (#RL)	ו	TTT	r
Traffic Volume (vph)	300	1200	100
Storage Length (ft)	400	_	400
Storage Lanes (#)	1	—	1
Taper Length (ft)	25	—	25
Lane Alignment	Left	Left	Right
Lane Width (ft)	12	12	12
Enter Blocked Intersection	No	No	No
Median Width (ft)	—	12	_
Link Offset (ft)	—	0	_
Crosswalk Width (ft)	—	0	_
TWLTL Median	—		_
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)	15	—	9
Mandatory Distance (ft)	—	200	_
Positioning Distance (ft)	—	2199	_
Mandatory Distance 2 (ft)	—	1466	_
Positioning Distance 2 (ft)	_	2932	_







Can enter yes, no, 1, or 2 (which allows 1 or 2 vehicles to enter blocked intersection)



SIMULATION SETTINGS	≯	-+	\mathbf{i}
SINGERHOR SETTINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	۳	<u> </u>	1
Traffic Volume (vph)	300	1200	100
Storage Length (ft)	400	_	400
Storage Lanes (#)	1	—	1
Taper Length (ft)	25	_	25
Lane Alignment	Left	Left	Right
Lane Width (ft)	12	12	12
Enter Blocked Intersection	No	No	No
Median Width (ft)	—	12	
Median Width (ft) Link Offset (ft)		12 0	_
Median Width (ft) Link Offset (ft) Crosswalk Width (ft)		12 0 0	-
Median Width (ft) Link Offset (ft) Crosswalk Width (ft) TWLTL Median	-	12 0 0	
Median Width (ft) Link Offset (ft) Crosswalk Width (ft) TWLTL Median Headway Factor	 1.00	12 0 0 1.00	 1.00
Median Width (ft) Link Offset (ft) Crosswalk Width (ft) TWLTL Median Headway Factor Turning Speed (mph)	 1.00 15	12 0 0 1.00	 1.00 9
Median Width (ft) Link Offset (ft) Crosswalk Width (ft) TWLTL Median Headway Factor Turning Speed (mph) Mandatory Distance (ft)	 1.00 15 	12 0 1.00 200	 1.00 9
Median Width (ft) Link Offset (ft) Crosswalk Width (ft) TWLTL Median Headway Factor Turning Speed (mph) Mandatory Distance (ft) Positioning Distance (ft)	 1.00 15 	12 0 1.00 200 2199	
Median Width (ft) Link Offset (ft) Crosswalk Width (ft) TWLTL Median Headway Factor Turning Speed (mph) Mandatory Distance (ft) Positioning Distance (ft) Mandatory Distance 2 (ft)	 1.00 15 	12 0 1.00 200 2199 1466	





SIMULATION SETTINGS	≯		-+		\mathbf{i}	
SINCESTON SETTINGS	EBL		EBT		EBR	
Lanes and Sharing (#RL)		۳.	- 11	↑		ľ
Traffic Volume (vph)	30	00	120)0	1	00
Storage Length (ft)	40	00	-	_	4	00
Storage Lanes (#)		1	-	_		1
Taper Length (ft)		25	-	_	:	25
Lane Alignment	Le	eft	Le	eft	Rig	ght
Lane Width (ft)	-	12	1	2		12
Enter Blocked Intersection	N	ło	N	lo	ľ	٧o
Median Width (ft)	-	_	1	2	-	_
Link Offset (ft)	-	_		0		_
Crosswalk Width (ft)	-	_		0	-	_
TWLTL Median	-	_				_
Headway Factor	1.0	00	1.0)0	1.	00
Turning Speed (mph)		15	-	_		9
Mandatory Distance (ft)	-	_	- 20)0	-	_
Positioning Distance (ft)	-	_	219	99		_
Mandatory Distance 2 (ft)	-	_	146	6	-	_
Positioning Distance 2 (ft)	-	_	293	32		_





SIMULATION SETTINGS			
Lanes and Sharing (#RL)		*	7
Traffic Volume (vph)	300	1200	100
Storage Length (ft)	400	_	400
Storage Lanes (#)	1	—	1
Taper Length (ft)	25	_	25
Lane Alignment	Left	Left	Right
Lane Width (ft)	12	12	12
Enter Blocked Intersection	No	No	No
Median Width (ft)	_	12	_
Link Offset (ft)	_	0	—
Crosswalk Width (ft)	—	0	_
TWLTL Median	—		—
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)	15	—	9
Mandatory Distance (ft)	—	200	_
Positioning Distance (ft)	—	2199	—
Mandatory Distance 2 (ft)	-	1466	_
Positioning Distance 2 (ft)	-	2932	_







SIMULATION SETTINGS	∕	→	\mathbf{N}
SIMOLATION SETTINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	ሻ	<u></u>	1
Traffic Volume (vph)	300	1200	100
Storage Length (ft)	400	_	400
Storage Lanes (#)	1	—	1
Taper Length (ft)	25	_	25
Lane Alignment	Left	Left	Right
Lane Width (ft)	12	12	12
Enter Blocked Intersection	No	No	No
Median Width (ft)	_	12	_
Link Offset (ft)	_	0	_
Crosswalk Width (ft)	—	0	—
TWLTL Median	—		—
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)	15	—	9
Mandatory Distance (ft)	—	200	—
Positioning Distance (ft)	_	2199	_
Mandatory Distance 2 (ft)	_	1466	_
Positioning Distance 2 (ft)	_	2932	_



- Not used for capacity calculations
- Applied to model saturated flow rates for specific lane groups

SIMULATION SETTINGS	≯	→	\mathbf{r}
SIMOLATION SETTINGS	EBL	EBT	EBR
Lanes and Sharing (#RL)	۲	i †††	1
Traffic Volume (vph)	300	1200	100
Storage Length (ft)	400	_	400
Storage Lanes (#)	1	_	1
Taper Length (ft)	25	_	25
Lane Alignment	Left	Left	Right
Lane Width (ft)	12	12	12
Enter Blocked Intersection	No	No	No
Median Width (ft)		12	_
Link Offset (ft)	_	0	_
Crosswalk Width (ft)		0	_
TWLTL Median	_		_
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)	15	—	9
Mandatory Distance (ft)	-	200	_
Positioning Distance (ft)	_	2199	_
Mandatory Distance 2 (ft)	_	1466	_
Positioning Distance 2 (ft)	_	2932	_



- Mandatory Distance
 - Distance back from stop bar where lane change must occur
- Positioning Distance
 - Distance from mandatory point where vehicle first attempts to change lanes
- Mandatory & Positioning Dist. 2
 - Used if second lane change is required

SIMULATION SETTINGS	EBL	→ EBT	EBR
Lanes and Sharing (#RL)	7	^	1
Traffic Volume (vph)	300	1200	100
Storage Length (ft)	400	_	400
Storage Lanes (#)	1	_	1
Taper Length (ft)	25	_	25
Lane Alignment	Left	Left	Righ
Lane Width (ft)	12	12	12
Enter Blocked Intersection	No	No	No
Median Width (ft)	_	12	_
Link Offset (ft)	—	0	
Crosswalk Width (ft)	_	0	_
TWLTL Median	—		
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)	15	_	Ş
Mandatory Distance (ft)	—	200	_
Positioning Distance (ft)	_	2199	
Mandatory Distance 2 (ft)	_	1466	_
Positioning Distance 2 (ft)	_	2932	

Detector Settings

- Three types
 - Calling places call when phase is yellow or red
 - Extend places call when phase is green
 - CI+Ex combination of two previous

DETECTOR SETTINGS	>	-	\mathbf{i}
	EBL	EBT	EBR
Lanes and Sharing (#RL)	ካ	<u></u>	r
Traffic Volume (vph)	300	1200	100
Number of Detectors (#)	1	2	1
Detector Phases	7	4	4
Switch Phase	0	0	0
Leading Detector (ft)	20	100	20
Trailing Detector (ft)	0	0	0
Detector Template	Left	Thru	Right
Add/Update Template			
Detector 1 Position (ft)	0	0	0
Detector 1 Size (ft)	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+E>
Detector 1 Channels			
Detector 1 Extend	0.0	0.0	0.0
Detector 1 Queue	0.0	0.0	0.0
Detector 1 Delay	0.0	0.0	0.0
Detector 2 Position (ft)	_	94	_
Detector 2 Size (ft)	_	6	_
Detector 2 Type	_	CI+Ex	_
Detector 2 Channels	_		_
Detector 2 Extend	_	0.0	_



Detector Settings

- Extend
 - Extends call for *n* seconds after detection
- Queue
 - Extends phase for *n* seconds to provide queue clearance
- Delay
 - Will not place a call on red or yellow until vehicle has been there n seconds

DETECTOR SETTINGS	≯	→	\mathbf{N}
	EBL	EBT	EBR
Lanes and Sharing (#RL)	ሻ	<u></u>	1
Traffic Volume (vph)	300	1200	100
Number of Detectors (#)	1	2	1
Detector Phases	7	4	4
Switch Phase	0	0	0
Leading Detector (ft)	20	100	20
Trailing Detector (ft)	0	0	0
Detector Template	Left	Thru	Right
Add/Update Template			
Detector 1 Position (ft)	0	0	0
Detector 1 Size (ft)	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channels			_
Detector 1 Extend	0.0	0.0	0.0
Detector 1 Queue	0.0	0.0	0.0
Detector 1 Delay	0.0	0.0	0.0
Detector 2 Position (rt)		94	_
Detector 2 Size (ft)	—	6	—
Detector 2 Type	—	CI+Ex	—
Detector 2 Channels	—		_
Detector 2 Extend	_	0.0	_

Questions?

References

Husch, D. & Albeck, J. (2006). *Synchro Studio 7 User Guide*. Sugar Land, TX: Trafficware, Ltd.

