

G

Appendix G Existing Corridor MMLoS



Actual	C		D	D	D
SCENARIO:		109 Street (Wihkwëntôwin)			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	C		D	D	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	Greater than 3.0		Mixed traffic with > 1 lane per direction	3.4 - 3.6	0.70 - 0.79
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.0 - 1.2		Low presence of passenger amenities such as shelters, seating, shade trees, etc.	D	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	201 - 230		C		
Measure 4		-	-	-	-

Actual	B		C	E	D
SCENARIO:		124 Street			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B		C	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.6 - 3.0		Mixed traffic with > 1 lane per direction	Less than 3.4	0.60 - 0.69
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.3 - 1.5		Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	D	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200		B		
Measure 4		-	-	-	-

Actual	C		B	E	D
SCENARIO:	104 Avenue				
Area Type:	Urban Main Street				
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	C		B	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5		Dedicated lanes	Less than 3.4	0.70 - 0.79
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.3 - 1.5		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	D	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200		C		
Measure 4		-	-	-	-

Actual	B		C	E	D
SCENARIO:		Jasper Avenue			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B		C	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5		Mixed traffic with > 1 lane per direction	Less than 3.4	0.80 - 0.89
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Greater than 2.5		Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	D	7-8
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200		B		
Measure 4		-	-	-	-

Actual	B	D			D
SCENARIO:		100 Avenue			
Area Type:		Urban Boulevard			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	B	D		E
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B	D			D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					Yes
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5	1.6 - 1.8			0.90 - 1.00
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Greater than 2.5	Has physical measures AND buffer width is 0.5 - 1			5-6
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	One "moderate" conflict indicator and one "high" conflict indicator			
Measure 4		-	-	-	-

Actual	D	B	B	D	C
SCENARIO:		Stony Plain Road (with LRT)			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	B	B	D	C
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5	1.6 - 1.8	Dedicated lanes	Less than 3.4	0.80 - 0.89
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.3 - 1.5	Has physical measures AND buffer width > 1	Abundance of passenger amenities such as shelters, seating, shade trees, etc.	C	3-4
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	Greater than 320	Two "low" conflict indicators	D		
Measure 4		-	-	-	-

Actual	E	F	D	C	D
SCENARIO: <i>Stony Plain Road (without LRT)</i>					
Area Type: <i>Urban Main Street</i>					
MODE					
Type					
SEGMENTS					
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	E	F	D	C	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	1.8 - 2.0	Less than 1.2	Mixed traffic with > 1 lane per direction	3.4 - 3.6	0.70 - 0.79
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Less than 1.0		Low presence of passenger amenities such as shelters, seating, shade trees, etc.	C	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	Greater than 320	Two "high" conflict indicators	E		
Measure 4		-	-	-	-

Actual	D	F	B	D	B
SCENARIO:		156 Street / Meadowlark Road			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	F	B	D	B
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5	Less than 1.2	Dedicated lanes	Less than 3.4	0.60 - 0.69
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.3 - 1.5		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	B	3-4
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	Greater than 320	Two "high" conflict indicators	D		
Measure 4		-	-	-	-

Actual	C	C	C	D	D
SCENARIO:	109 Street (Garneau)				
Area Type:	Urban Main Street				
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			B1 and B2 Routes		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	C	C	C	D	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5	1.6 - 1.8	Mixed traffic with > 1 lane per direction	3.4 - 3.6	0.80 - 0.89
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.0 - 1.2	Has physical measures and buffer width is 0.3 - 0.5 OR Has physical measures and buffer width is 0.3 - 0.5	Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	E	7-8
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	201 - 230	Two "low" conflict indicators	C		
Measure 4		-	-	-	-

Actual	D	B	B	C	B
SCENARIO:		114 Street			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	B	B	C	B
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5	1.6 - 1.8	Dedicated lanes	3.4 - 3.6	0.60 - 0.69
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Less than 1.0	Has physical measures AND buffer width > 1	Abundance of passenger amenities such as shelters, seating, shade trees, etc.	B	3-4
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	201 - 230	Two "low" conflict indicators	D		
Measure 4		-	-	-	-

Actual	D	F	C	E	D
SCENARIO:		82 Avenue			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	F	C	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	1.8 - 2.0	Less than 1.2	Mixed traffic with > 1 lane per direction	Less than 3.4	0.60 - 0.69
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Less than 1.0		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	D	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "high" conflict indicators	D		
Measure 4		-	-	-	-

Actual	C	F	C	D	C
SCENARIO:		87 Avenue			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	C	F	C	D	C
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	1.8 - 2.0	Less than 1.2	Mixed traffic with > 1 lane per direction	Less than 3.4	0.70 - 0.79
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.6 - 2.0		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	C	5-6
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "high" conflict indicators	C		
Measure 4		-	-	-	-

H

Appendix H Recommended Corridor MMLoS



Actual	B		B	E	D
SCENARIO:		109 Street (Wihkwëntôwin)			
Area Type:		Urban Main Street			
MODE					
Type					
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B		B	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	Greater than 3.0		Dedicated lanes	Less than 3.4	0.90 - 1.00
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.3 - 1.5		Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	D	5-6
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	201 - 230		B		
Measure 4		-	-	-	-

Actual	B		B	E	D
SCENARIO:		124 Street			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B		B	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.6 - 3.0		Dedicated lanes	Less than 3.4	0.70 - 0.79
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.6 - 2.0		Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	D	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200		B		
Measure 4		-	-	-	-

Actual	B		A	E	D
SCENARIO: 104 Avenue					
Area Type: Urban Main Street					
MODE					
Type					
	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B		A	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.6 - 3.0		Dedicated lanes	Less than 3.4	0.70 - 0.79
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.6 - 2.0		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	D	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200		B		
Measure 4		-	-	-	-

Actual	B		C	E	D
SCENARIO:		Jasper Avenue			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B		C	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5		Mixed traffic with > 1 lane per direction	Less than 3.4	0.80 - 0.89
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Greater than 2.5		Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	D	7-8
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200		B		
Measure 4		-	-	-	-

Actual	A	B			D
SCENARIO:	100 Avenue				
Area Type:	Urban Boulevard				
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	B	D		E
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	A	B			D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					Yes
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.6 - 3.0	1.6 - 1.8			0.90 - 1.00
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	Greater than 2.5	Has physical measures AND buffer width is 0.5 - 1			5-6
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "low" conflict indicators			
Measure 4		-	-	-	-

Actual	B	B	A	D	C
SCENARIO:		Stony Plain Road (with LRT)			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B	B	A	D	C
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.6 - 3.0	1.6 - 1.8	Dedicated lanes	Less than 3.4	0.80 - 0.89
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.6 - 2.0	Has physical measures AND buffer width > 1	Abundance of passenger amenities such as shelters, seating, shade trees, etc.	C	3-4
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "low" conflict indicators	B		
Measure 4		-	-	-	-

Actual	B	F	C	D	D
SCENARIO:		Stony Plain Road (without LRT)			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B	F	C	D	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5	Less than 1.2	Mixed traffic with > 1 lane per direction	3.4 - 3.6	0.80 - 0.89
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.6 - 2.0		Moderate presence of passenger amenities such as shelters, seating, shade trees, etc.	D	7-8
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "high" conflict indicators	B		
Measure 4		-	-	-	-

Actual	C	F	B	D	B
SCENARIO:		156 Street / Meadowlark Road			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	C	F	B	D	B
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.6 - 3.0	Less than 1.2	Dedicated lanes	Less than 3.4	0.60 - 0.69
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.6 - 2.0		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	B	3-4
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	231 - 260	Two "high" conflict indicators	C		
Measure 4		-	-	-	-

Actual	B	C	B	D	E
SCENARIO: 109 Street (Garneau)					
Area Type: Urban Main Street					
MODE					
Type					
SEGMENTS					
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			B1 and B2 Routes		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B	C	B	D	E
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	2.1 - 2.5	1.6 - 1.8	Dedicated lanes	3.4 - 3.6	0.90 - 1.00
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.6 - 2.0	Has physical measures and buffer width is 0.3 - 0.5 OR Has physical measures and buffer width is 0.3 - 0.5	Abundance of passenger amenities such as shelters, seating, shade trees, etc.	E	7-8
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "low" conflict indicators	C		
Measure 4		-	-	-	-

Actual	B	B	A	C	B
SCENARIO: 114 Street					
Area Type: Urban Main Street					
MODE					
Type					
SEGMENTS					
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)			LRT		
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B	B	A	C	B
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	Greater than 3.0	1.6 - 1.8	Dedicated lanes	3.4 - 3.6	0.60 - 0.69
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.3 - 1.5	Has physical measures AND buffer width > 1	Abundance of passenger amenities such as shelters, seating, shade trees, etc.	B	3-4
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	201 - 230	Two "low" conflict indicators	B		
Measure 4		-	-	-	-

Actual	B	F	B	E	D
SCENARIO:		82 Avenue			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	D	D	D
Adjustment for Planning Direction	Upwards	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B	F	B	E	D
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	1.8 - 2.0	Less than 1.2	Mixed traffic with > 1 lane per direction	Less than 3.4	0.60 - 0.69
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	2.1 - 2.5		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	D	9+
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "high" conflict indicators	B		
Measure 4		-	-	-	-

Actual	B	F	B	D	C
SCENARIO:		87 Avenue			
Area Type:		Urban Main Street			
MODE					
Type	SEGMENTS				
Target (Custom if necessary)	B	C	C	D	D
Adjustment for Planning Direction	Upwards	None	Upwards	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	B	F	B	D	C
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	1.8 - 2.0	Less than 1.2	Mixed traffic with > 1 lane per direction	Less than 3.4	0.70 - 0.79
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	2.1 - 2.5		Abundance of passenger amenities such as shelters, seating, shade trees, etc.	C	5-6
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "high" conflict indicators	B		
Measure 4		-	-	-	-



Appendix I

HCM Sensitivity Analysis – AM Peak



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Priority Growth Areas Mobility Study

Vistro File: Z:\...\Z0016285 PGA Sensitivity Analysis.vistro
Report File: Z:\...\AM Sensitivity Analysis +10% Volume.pdf

Scenario 6 +10% AM
2025-04-24

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	104 Avenue and 109 Street	Signalized	HCM 7th Edition	NB Left	0.840	88.0	F
17	Stony Plain Road and 149 Street	Signalized	HCM 7th Edition	EB Left	0.761	53.5	D
21	95 Avenue and 156 Street	Signalized	HCM 7th Edition	SB Left	0.619	49.7	D
26	109 Street and 87 Ave	Signalized	HCM 7th Edition	NB Left	0.568	98.0	F
29	114 Street and 82 Ave	Signalized	HCM 7th Edition	EB Left	0.764	47.9	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: 104 Avenue and 109 Street

Control Type:	Signalized	Delay (sec / veh):	88.0
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.840

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.66	3.60	3.60
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	0	0	1
Entry Pocket Length [m]	100.00	30.48	30.48	100.00	30.48	30.48	70.00	30.48	30.48	30.48	30.48	55.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	163	1319	33	159	1520	22	89	971	231	0	496	197
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	2	0	0	23	0	0	20
Total Hourly Volume [veh/h]	163	1319	33	159	1520	22	89	971	231	0	496	197
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	330	8	40	380	6	22	243	58	0	124	49
Total Analysis Volume [veh/h]	163	1319	33	159	1520	22	89	971	231	0	496	197
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	49			49			49			49		
v_di, Inbound Pedestrian Volume crossing m	49			49			49			49		
v_co, Outbound Pedestrian Volume crossing	50			50			50			50		
v_ci, Inbound Pedestrian Volume crossing mi	50			50			50			50		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	150
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	4	0	3	4	0	1	5	0	0	2	0
Auxiliary Signal Groups												
Maximum Green [s]	8	40	0	8	40	0	7	81	0	0	68	0
Amber [s]	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	3.0	3.0	0.0	3.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	5.0	5.0	0.0	5.0	5.0	0.0	4.0	5.0	0.0	0.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	23	61	0	23	61	0	18	66	0	0	48	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	0	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No			No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes			Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes			Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	C	R
C, Calculated Cycle Length [s]	150	150	150	150	150	150	150	150	150	150	150
L, Total Lost Time per Cycle [s]	7.00	7.00	7.00	7.00	7.00	7.00	6.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	16	49	49	16	49	49	12	54	54	36	36
g / C, Green / Cycle	0.11	0.33	0.33	0.11	0.33	0.33	0.08	0.36	0.36	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.11	0.30	0.30	0.11	0.34	0.35	0.06	0.37	0.38	0.17	0.16
s, saturation flow rate [veh/h]	1476	2951	1518	1476	2951	1531	1476	1683	1514	2951	1255
c, Capacity [veh/h]	157	964	496	157	964	500	118	606	545	708	301
d1, Uniform Delay [s]	67.00	48.69	48.87	67.00	50.50	50.50	67.55	48.00	48.00	52.07	50.24
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	81.29	15.52	26.47	74.28	43.39	56.00	35.34	42.24	58.32	5.70	10.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.04	0.92	0.93	1.01	1.05	1.06	0.75	1.02	1.07	0.70	0.65
d, Delay for Lane Group [s/veh]	148.29	64.21	75.34	141.28	93.89	106.50	102.89	90.24	106.32	57.77	60.81
Lane Group LOS	F	E	E	F	F	F	F	F	F	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	9.60	18.09	20.32	9.29	23.80	26.45	4.51	29.58	29.05	9.13	7.45
50th-Percentile Queue Length [m/ln]	73.15	137.85	154.82	70.82	181.33	201.52	34.38	225.39	221.34	69.54	56.76
95th-Percentile Queue Length [veh/ln]	14.89	25.07	27.71	14.35	32.88	36.20	8.00	39.11	39.69	14.08	11.93
95th-Percentile Queue Length [m/ln]	113.48	191.00	211.15	109.35	250.53	275.85	60.93	298.03	302.47	107.29	90.87

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	148.29	67.82	75.34	141.28	98.09	106.50	102.89	96.07	106.32	0.00	57.77	60.81
Movement LOS	F	E	E	F	F	F	F	F	F		E	E
d_A, Approach Delay [s/veh]	76.65			102.24			98.37			58.63		
Approach LOS	E			F			F			E		
d_I, Intersection Delay [s/veh]	88.01											
Intersection LOS	F											
Intersection V/C	0.840											

Emissions

Vehicle Kilometers Traveled [km/h]	72.78	397.49	206.17	33.54	213.80	111.49	22.95	159.68	150.29	114.14	45.33
Stops [stops/h]	230.41	868.34	487.63	223.05	1142.24	634.70	108.29	709.88	697.15	438.04	178.78
Fuel consumption [L/h]	30.71	101.32	57.35	25.50	119.25	68.20	11.67	74.16	77.66	42.75	17.55
CO [g/h]	567.07	1871.00	1058.98	470.80	2202.08	1259.34	215.42	1369.33	1434.08	789.49	324.08
NOx [g/h]	110.33	364.03	206.04	91.60	428.45	245.02	41.91	266.42	279.02	153.61	63.05
VOC [g/h]	131.42	433.62	245.43	109.11	510.35	291.87	49.93	317.35	332.36	182.97	75.11

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	6.01			6.72			9.81			9.62		
d_p, Pedestrian Delay [s]	64.40			64.40			64.40			64.40		
I_p,int, Pedestrian LOS Score for Intersectio	3.097			3.101			2.760			2.732		
Crosswalk LOS	C			C			C			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	653			653			720			480		
d_b, Bicycle Delay [s]	34.00			34.00			30.72			43.32		
I_b,int, Bicycle LOS Score for Intersection	2.395			2.496			2.644			2.148		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: Stony Plain Road and 149 Street

Control Type:	Signalized	Delay (sec / veh):	53.5
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.761

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [m]	90.00	30.48	30.48	65.00	30.48	75.00	50.00	30.48	15.00	110.00	30.48	75.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	60.00			60.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	45	1217	436	19	644	65	100	472	54	64	602	264
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	44	0	0	7	0	0	5	0	0	26
Total Hourly Volume [veh/h]	45	1217	436	19	644	65	100	472	54	64	602	264
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	304	109	5	161	16	25	118	14	16	151	66
Total Analysis Volume [veh/h]	45	1217	436	19	644	65	100	472	54	64	602	264
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	10			10			10			10		
v_di, Inbound Pedestrian Volume crossing m	10			10			10			10		
v_co, Outbound Pedestrian Volume crossing	10			10			10			10		
v_ci, Inbound Pedestrian Volume crossing mi	10			10			10			10		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	44.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	7	0	5	6	0	1	3	0	1	3	0
Auxiliary Signal Groups												
Maximum Green [s]	0	40	0	8	51	0	11	37	0	11	37	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	30	0	0	30	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	5.0	0.0	1.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	51	0	8	59	0	15	46	0	15	46	0
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No		No	No		No	No		No	No	
Maximum Recall		Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall		Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	5.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	44	44	44	52	52	52	8	39	39	8	39	39
g / C, Green / Cycle	0.37	0.37	0.37	0.43	0.43	0.43	0.07	0.33	0.33	0.07	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.06	0.37	0.27	0.04	0.20	0.04	0.06	0.25	0.03	0.02	0.32	0.17
s, saturation flow rate [veh/h]	734	3279	1589	456	3279	1553	1640	1870	1589	3186	1870	1589
c, Capacity [veh/h]	215	1202	583	174	1421	673	109	608	517	212	608	517
d1, Uniform Delay [s]	39.74	38.00	33.16	28.04	23.97	20.09	55.66	36.57	28.30	53.34	40.32	32.78
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.20	28.98	8.53	1.26	1.05	0.29	65.27	9.42	0.41	3.61	34.27	3.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.21	1.01	0.75	0.11	0.45	0.10	0.91	0.78	0.10	0.30	0.99	0.51
d, Delay for Lane Group [s/veh]	41.93	66.98	41.69	29.30	25.02	20.37	120.93	45.98	28.71	56.95	74.59	36.37
Lane Group LOS	D	F	D	C	C	C	F	D	C	E	E	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.24	21.83	12.13	0.36	6.49	1.12	4.98	13.94	1.15	1.03	23.16	6.71
50th-Percentile Queue Length [m/ln]	9.43	166.34	92.46	2.76	49.43	8.50	37.97	106.25	8.78	7.82	176.46	51.12
95th-Percentile Queue Length [veh/ln]	2.23	29.74	17.85	0.65	10.66	2.01	8.64	20.07	2.07	1.85	31.05	10.96
95th-Percentile Queue Length [m/ln]	16.97	226.66	135.99	4.97	81.26	15.30	65.87	152.92	15.80	14.08	236.60	83.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	41.93	66.98	41.69	29.30	25.02	20.37	120.93	45.98	28.71	56.95	74.59	36.37
Movement LOS	D	F	D	C	C	C	F	D	C	E	E	D
d_A, Approach Delay [s/veh]	59.82			24.72			56.47			62.52		
Approach LOS	E			C			E			E		
d_I, Intersection Delay [s/veh]	53.51											
Intersection LOS	D											
Intersection V/C	0.761											

Emissions

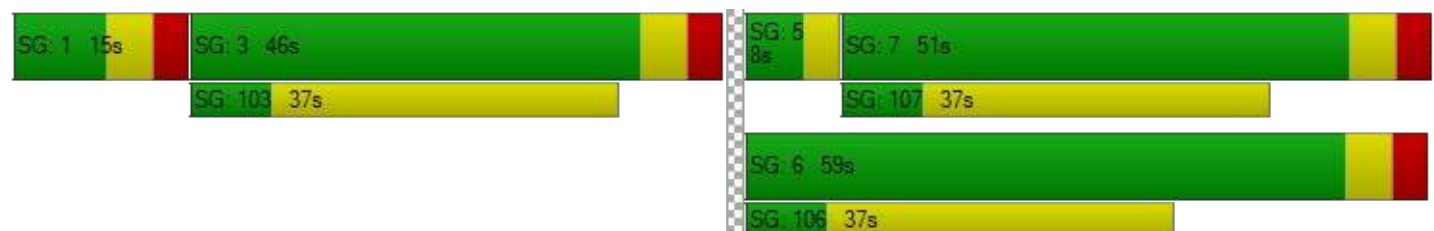
Vehicle Kilometers Traveled [km/h]	11.30	305.67	109.51	3.97	134.50	13.58	23.80	112.35	12.85	23.06	216.93	95.13
Stops [stops/h]	37.12	1309.74	364.00	10.87	389.22	33.47	149.51	418.31	34.56	61.61	694.73	201.27
Fuel consumption [L/h]	3.64	131.68	35.29	1.13	36.68	3.28	14.93	36.79	3.19	6.38	70.81	20.96
CO [g/h]	67.13	2431.55	651.57	20.77	677.38	60.61	275.74	679.38	58.95	117.88	1307.51	387.06
NOx [g/h]	13.06	473.09	126.77	4.04	131.79	11.79	53.65	132.18	11.47	22.94	254.39	75.31
VOC [g/h]	15.56	563.54	151.01	4.81	156.99	14.05	63.91	157.45	13.66	27.32	303.03	89.71

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			92.53			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	56.70			32.22			53.57			25.21		
d_p, Pedestrian Delay [s]	49.50			49.50			49.50			49.50		
I_p,int, Pedestrian LOS Score for Intersectio	2.948			2.950			2.524			2.685		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	733			867			650			650		
d_b, Bicycle Delay [s]	24.07			19.27			27.34			27.34		
I_b,int, Bicycle LOS Score for Intersection	2.997			2.166			2.601			3.137		
Bicycle LOS	C			B			B			C		

Sequence

Ring 1	1	3	5	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: 95 Avenue and 156 Street

Control Type:	Signalized	Delay (sec / veh):	49.7
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [m]	75.00	30.48	30.48	75.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	227	453	134	48	203	92	59	342	45	68	293	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	13	0	0	9	0	0	5	0	0	3
Total Hourly Volume [veh/h]	227	453	134	48	203	92	59	342	45	68	293	31
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	113	34	12	51	23	15	86	11	17	73	8
Total Analysis Volume [veh/h]	227	453	134	48	203	92	59	342	45	68	293	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	20			20			20			20		
v_di, Inbound Pedestrian Volume crossing m	20			20			20			20		
v_co, Outbound Pedestrian Volume crossing	20			20			20			20		
v_ci, Inbound Pedestrian Volume crossing mi	20			20			20			20		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	40.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	2	3	0	1	5	0	7	9	0	7	9	0
Auxiliary Signal Groups												
Maximum Green [s]	22	42	0	12	32	0	7	31	0	7	31	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	30	0	0	30	0	0	30	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	3.0	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	26	56	0	12	42	0	8	44	0	8	44	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	0.00	3.00
g_i, Effective Green Time [s]	21	46	7	32	47	34	47	34
g / C, Green / Cycle	0.18	0.38	0.06	0.27	0.39	0.28	0.39	0.28
(v / s)_i Volume / Saturation Flow Rate	0.14	0.33	0.03	0.17	0.05	0.23	0.06	0.19
s, saturation flow rate [veh/h]	1640	1783	1640	1744	1192	1671	1147	1680
c, Capacity [veh/h]	287	683	96	465	374	473	321	476
d1, Uniform Delay [s]	47.40	34.02	54.81	38.84	24.90	40.11	26.17	38.18
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.61	13.27	17.56	6.46	0.90	14.48	1.50	7.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.86	0.50	0.63	0.16	0.82	0.21	0.68
d, Delay for Lane Group [s/veh]	67.01	47.29	72.37	45.30	25.80	54.59	27.67	45.84
Lane Group LOS	E	D	E	D	C	D	C	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	8.04	17.94	1.87	8.47	1.16	12.46	1.36	9.43
50th-Percentile Queue Length [m/ln]	61.24	136.72	14.28	64.56	8.80	94.94	10.39	71.82
95th-Percentile Queue Length [veh/ln]	12.69	24.89	3.37	13.25	2.08	18.25	2.46	14.46
95th-Percentile Queue Length [m/ln]	96.67	189.65	25.70	100.94	15.84	139.05	18.71	110.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	67.01	47.29	47.29	72.37	45.30	45.30	25.80	54.59	54.59	27.67	45.84	45.84
Movement LOS	E	D	D	E	D	D	C	D	D	C	D	D
d_A, Approach Delay [s/veh]	52.79			49.09			50.78			42.69		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	49.72											
Intersection LOS	D											
Intersection V/C	0.619											

Emissions

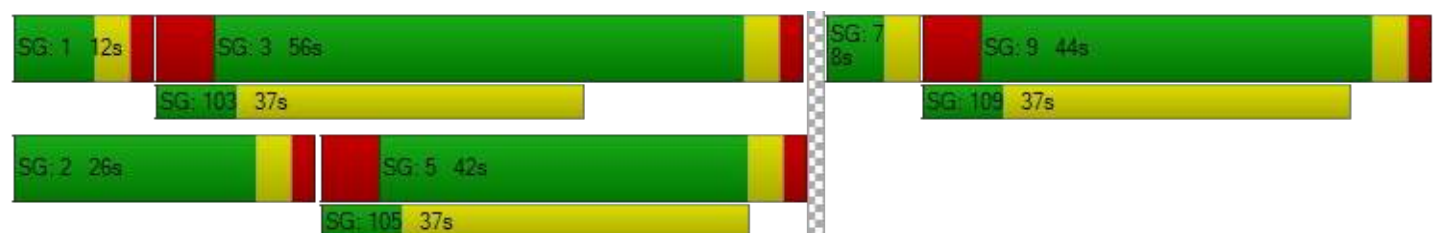
Vehicle Kilometers Traveled [km/h]	57.37	148.34	16.31	100.24	16.88	110.71	23.38	111.41
Stops [stops/h]	241.10	538.26	56.21	254.18	34.65	373.79	40.92	282.76
Fuel consumption [L/h]	22.58	47.57	5.49	25.53	3.56	35.19	4.59	28.38
CO [g/h]	417.00	878.40	101.35	471.46	65.66	649.83	84.79	524.11
NOx [g/h]	81.13	170.90	19.72	91.73	12.77	126.43	16.50	101.97
VOC [g/h]	96.64	203.58	23.49	109.27	15.22	150.60	19.65	121.47

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	27.17	28.10	21.79	18.60
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.388	2.294	2.423	2.384
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	767	533	567	567
d_b, Bicycle Delay [s]	22.82	32.27	30.82	30.82
I_b,int, Bicycle LOS Score for Intersection	2.924	2.140	2.304	2.211
Bicycle LOS	C	B	B	B

Sequence

Ring 1	1	3	7	9	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: 109 Street and 87 Ave

Control Type:	Signalized	Delay (sec / veh):	98.0
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.568

Intersection Setup

Name	109 Street				109 Street				87 Ave			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration												
Turning Movement	Left	Thru	Thru	Right	Left	Left	Thru	Right	Left	Left	Thru	Right
Lane Width [m]	3.20	3.66	3.20	4.00	3.66	3.66	3.60	4.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Entry Pocket Length [m]	80.00	30.48	30.48	35.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	45.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00				50.00				50.00			
Grade [%]	0.00				0.00				0.00			
Curb Present	Yes				Yes				Yes			
Crosswalk	Yes				Yes				Yes			

Volumes

Name	109 Street				109 Street				87 Ave			
Base Volume Input [veh/h]	686	1432	0	10	0	0	833	413	329	0	1	212
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	1	0	0	0	41	0	0	0	21
Total Hourly Volume [veh/h]	686	1432	0	9	0	0	833	372	329	0	1	191
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	172	358	0	2	0	0	208	93	82	0	0	48
Total Analysis Volume [veh/h]	686	1432	0	9	0	0	833	372	329	0	1	191
Presence of On-Street Parking	No			No	No			No	No			No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	53				0				13			
v_di, Inbound Pedestrian Volume crossing th	52				0				14			
v_co, Outbound Pedestrian Volume along th	16				14				52			
v_ci, Inbound Pedestrian Volume along the l	16				13				53			
v_ab, Corner Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycles/h]	25				6				5			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	200
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	85.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Overlap	Overlap	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	1	0	3	0	0	1	0	0	0	3	2
Auxiliary Signal Groups	1,2	1,2		1,3								
Maximum Green [s]	30	59	0	26	0	0	59	0	0	0	26	30
Amber [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
All red [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
Walk [s]	0	8	0	7	0	0	8	0	0	0	7	0
Pedestrian Clearance [s]	0	16	0	19	0	0	16	0	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk												
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	63	77	0	30	0	0	77	0	0	0	30	63
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	24	0	7	0	0	24	0	0	0	7	5
Vehicle Extension [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Minimum Recall	No	Yes		No			Yes				No	
Maximum Recall	Yes	No		No			No				No	
Pedestrian Recall	No	No		Yes			No				Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	C	R	C	C	L	C	R
C, Calculated Cycle Length [s]	200	200	200	200	200	200	200	200
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	135	135	132	72	72	25	25	25
g / C, Green / Cycle	0.68	0.68	0.66	0.36	0.36	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.69	0.45	0.01	0.36	0.39	0.12	0.17	0.14
s, saturation flow rate [veh/h]	987	3204	1440	1683	1551	1210	1106	1401
c, Capacity [veh/h]	548	2166	951	608	560	175	174	175
d1, Uniform Delay [s]	64.04	18.97	11.63	63.59	63.89	89.05	90.87	87.24
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.37	0.50	0.45
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	128.14	1.60	0.02	34.48	60.03	27.80	83.64	91.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.25	0.66	0.01	0.99	1.08	0.83	1.06	1.09
d, Delay for Lane Group [s/veh]	192.17	20.57	11.65	98.07	123.92	116.85	174.51	178.37
Lane Group LOS	F	C	B	F	F	F	F	F
Critical Lane Group	Yes	No	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	32.02	19.97	0.15	36.37	37.87	9.04	13.21	13.54
50th-Percentile Queue Length [m/ln]	243.96	152.16	1.14	277.14	288.59	68.87	100.68	103.21
95th-Percentile Queue Length [veh/ln]	48.84	27.30	0.27	46.26	50.54	13.97	19.65	20.35
95th-Percentile Queue Length [m/ln]	372.12	208.00	2.05	352.51	385.10	106.44	149.70	155.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	192.17	20.57	0.00	11.65	0.00	0.00	105.22	123.92	148.89	0.00	174.51	178.37
Movement LOS	F	C		B			F	F	F		F	F
d_A, Approach Delay [s/veh]	75.88				110.99				159.75			
Approach LOS	E				F				F			
d_I, Intersection Delay [s/veh]	98.02											
Intersection LOS	F											
Intersection V/C	0.568											

Emissions

Vehicle Kilometers Traveled [km/h]	72.47	151.29	0.95	62.38	62.38	28.85	36.28	37.70
Stops [stops/h]	576.28	718.86	2.69	654.67	681.72	162.69	237.83	243.80
Fuel consumption [L/h]	121.35	53.21	0.23	66.13	78.73	19.55	33.50	35.29
CO [g/h]	2240.80	982.61	4.27	1221.10	1453.81	360.94	618.54	651.72
NOx [g/h]	435.98	191.18	0.83	237.58	282.86	70.23	120.34	126.80
VOC [g/h]	519.33	227.73	0.99	283.00	336.94	83.65	143.35	151.04

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0				11.0				11.0			
M_corner, Corner Circulation Area [m²/ped]	18.16				210.96				0.00			
M_CW, Crosswalk Circulation Area [m²/ped]	3.30				0.00				0.00			
d_p, Pedestrian Delay [s]	89.30				89.30				89.30			
I_p,int, Pedestrian LOS Score for Intersectio	3.058				2.440				2.673			
Crosswalk LOS	C				B				B			
s_b, Saturation Flow Rate of the bicycle lane	2000				2000				2000			
c_b, Capacity of the bicycle lane [bicycles/h]	1350				720				250			
d_b, Bicycle Delay [s]	10.70				41.08				76.75			
I_b,int, Bicycle LOS Score for Intersection	3.315				2.588				2.454			
Bicycle LOS	C				B				B			

Intersection Setup								
Name	87 Ave							
Approach	Westbound				Southwestbound			
Lane Configuration								
Turning Movement	Left	Thru	Right	Right	Left	Thru	Right	Right
Lane Width [m]	3.50	3.66	3.50	3.66	3.66	3.66	3.66	3.66
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0
Entry Pocket Length [m]	30.48	30.48	30.48	10.00	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	30.00				50.00			
Grade [%]	0.00				0.00			
Curb Present	Yes							
Crosswalk	Yes				Yes			

Volumes

Name	87 Ave							
Base Volume Input [veh/h]	20	0	0	65	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00							
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	7	0	0	0	0
Total Hourly Volume [veh/h]	20	0	0	58	0	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	0	15	0	0	0	0
Total Analysis Volume [veh/h]	20	0	0	58	0	0	0	0
Presence of On-Street Parking	No			No				
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	16				0			
v_di, Inbound Pedestrian Volume crossing th	16				0			
v_co, Outbound Pedestrian Volume along th	0				0			
v_ci, Inbound Pedestrian Volume along the l	0				0			
v_ab, Corner Pedestrian Volume [ped/h]	0				0			
Bicycle Volume [bicycles/h]	0				0			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	200
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	85.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	3	0	0	0	0	0	0	0
Auxiliary Signal Groups								
Maximum Green [s]	26	0	0	0	0	0	0	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All red [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk [s]	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	19	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk								
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	30	0	0	0	0	0	0	0
Lead / Lag	Lag	-	-	-	-	-	-	-
Minimum Green [s]	7	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No							
Maximum Recall	No							
Pedestrian Recall	Yes							

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	R	
C, Calculated Cycle Length [s]	200	200	
L, Total Lost Time per Cycle [s]	5.00	5.00	
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	
l2, Clearance Lost Time [s]	3.00	3.00	
g_i, Effective Green Time [s]	25	25	
g / C, Green / Cycle	0.13	0.13	
(v / s)_i Volume / Saturation Flow Rate	0.02	0.04	
s, saturation flow rate [veh/h]	1072	1431	
c, Capacity [veh/h]	36	179	
d1, Uniform Delay [s]	100.00	79.80	
k, delay calibration	0.11	0.11	
l, Upstream Filtering Factor	1.00	1.00	
d2, Incremental Delay [s]	12.70	1.04	
d3, Initial Queue Delay [s]	0.00	0.00	
Rp, platoon ratio	1.00	1.00	
PF, progression factor	1.00	1.00	

Lane Group Results

X, volume / capacity	0.56	0.32	
d, Delay for Lane Group [s/veh]	112.70	80.84	
Lane Group LOS	F	F	
Critical Lane Group	No	No	
50th-Percentile Queue Length [veh/ln]	1.19	2.85	
50th-Percentile Queue Length [m/ln]	9.07	21.69	
95th-Percentile Queue Length [veh/ln]	2.14	5.12	
95th-Percentile Queue Length [m/ln]	16.33	39.05	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	112.70	0.00	0.00	80.84	0.00	0.00	0.00	0.00
Movement LOS	F			F				
d_A, Approach Delay [s/veh]	89.01				0.00			
Approach LOS	F				A			
d_I, Intersection Delay [s/veh]	98.02							
Intersection LOS	F							
Intersection V/C	0.568							

Emissions

Vehicle Kilometers Traveled [km/h]	0.73	2.11	
Stops [stops/h]	21.43	51.24	
Fuel consumption [L/h]	2.00	4.28	
CO [g/h]	36.86	78.98	
NOx [g/h]	7.17	15.37	
VOC [g/h]	8.54	18.30	

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	19.20	0.00
d_p, Pedestrian Delay [s]	89.30	89.30
I_p,int, Pedestrian LOS Score for Intersectio	2.007	3.169
Crosswalk LOS	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	250	0
d_b, Bicycle Delay [s]	76.56	100.00
I_b,int, Bicycle LOS Score for Intersection	1.560	4.132
Bicycle LOS	A	D

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 29: 114 Street and 82 Ave

Control Type:	Signalized	Delay (sec / veh):	47.9
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.764

Intersection Setup

Name	114 Street			114 Street			University Ave			82 Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵			↵↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.70	3.60	3.66	3.60	3.60	4.00	3.60	3.60	3.66	3.66	3.66
No. of Lanes in Entry Pocket	2	0	1	0	0	1	1	0	1	2	0	0
Entry Pocket Length [m]	170.00	30.48	2.00	30.48	30.48	105.00	95.00	30.48	95.00	100.00	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	114 Street			114 Street			University Ave			82 Ave		
Base Volume Input [veh/h]	870	1125	232	0	294	57	46	347	566	153	423	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	23	0	0	6	0	0	0	0	0	2
Total Hourly Volume [veh/h]	870	1125	209	0	294	57	46	347	566	153	423	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	218	281	52	0	74	14	12	87	142	38	106	5
Total Analysis Volume [veh/h]	870	1125	209	0	294	57	46	347	566	153	423	18
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			2			2			2		
v_di, Inbound Pedestrian Volume crossing m	2			2			2			2		
v_co, Outbound Pedestrian Volume crossing	18			0			0			18		
v_ci, Inbound Pedestrian Volume crossing mi	18			0			0			18		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	190
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Overlap	Permiss	Permiss	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	2	1	0	0	1	2	3	6	2	5	4	0
Auxiliary Signal Groups		1,2				1,2			2,6			
Maximum Green [s]	60	33	0	0	33	60	15	38	60	16	38	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	3.0	3.0	0.0	0.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	0	9	0	0	9	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	22	0	0	22	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	0.0	0.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	0.0
Detector Location [m]	1.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0
Detector Length [m]	5.0	5.0	0.0	0.0	5.0	5.0	5.0	0.0	0.0	5.0	5.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	70	33	0	0	33	70	46	36	70	51	41	0
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	10	27	0	0	27	10	7	29	10	7	29	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Minimum Recall	No	Yes			Yes	No	No	No	No	No	No	
Maximum Recall	No	No			No	No	No	Yes	No	No	Yes	
Pedestrian Recall	No	No			No	No	No	No	No	No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	R	L	C	C
C, Calculated Cycle Length [s]	167	167	167	167	167	167	167	167	167	167	167
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	4.00	4.00	0.00	5.00	5.00	0.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	60	99	33	33	99	6	38	104	10	42	42
g / C, Green / Cycle	0.36	0.59	0.20	0.20	0.59	0.04	0.23	0.62	0.06	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.37	0.35	0.15	0.09	0.04	0.03	0.12	0.24	0.05	0.14	0.14
s, saturation flow rate [veh/h]	2353	3204	1431	3204	1318	1535	2951	2329	3113	1550	1527
c, Capacity [veh/h]	859	1895	282	632	779	58	670	1447	193	390	384
d1, Uniform Delay [s]	56.12	21.53	63.18	59.40	14.60	79.88	56.67	15.85	77.43	54.75	54.77
k, delay calibration	0.11	0.34	0.23	0.11	0.11	0.11	0.50	0.11	0.11	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.51	0.93	8.01	0.53	0.04	20.96	2.85	0.17	7.11	5.93	6.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.01	0.59	0.74	0.47	0.07	0.79	0.52	0.39	0.79	0.57	0.57
d, Delay for Lane Group [s/veh]	73.63	22.47	71.19	59.93	14.64	100.84	59.52	16.02	84.54	60.68	60.83
Lane Group LOS	F	C	E	E	B	F	E	B	F	E	E
Critical Lane Group	Yes	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	20.65	14.16	9.04	5.61	0.97	2.32	6.75	5.52	3.46	8.89	8.80
50th-Percentile Queue Length [m/ln]	157.32	107.92	68.92	42.77	7.35	17.68	51.46	42.02	26.39	67.74	67.04
95th-Percentile Queue Length [veh/ln]	28.35	20.33	13.98	9.50	1.74	4.18	11.02	9.37	6.23	13.78	13.66
95th-Percentile Queue Length [m/ln]	216.00	154.95	106.50	72.37	13.24	31.83	83.93	71.37	47.51	105.01	104.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	73.63	22.47	71.19	0.00	59.93	14.64	100.84	59.52	16.02	84.54	60.75	60.83
Movement LOS	F	C	E		E	B	F	E	B	F	E	E
d_A, Approach Delay [s/veh]	47.28			52.58			35.83			66.88		
Approach LOS	D			D			D			E		
d_I, Intersection Delay [s/veh]	47.90											
Intersection LOS	D											
Intersection V/C	0.764											

Emissions

Vehicle Kilometers Traveled [km/h]	246.27	318.45	59.16	67.96	13.18	15.12	114.09	186.10	25.38	36.81	36.36
Stops [stops/h]	888.21	609.31	194.55	241.47	20.76	49.92	290.54	237.27	149.01	191.25	189.24
Fuel consumption [L/h]	92.69	63.44	21.45	25.45	2.36	6.13	33.28	30.02	15.72	18.16	17.97
CO [g/h]	1711.63	1171.38	396.13	470.02	43.62	113.22	614.55	554.25	290.28	335.34	331.85
NOx [g/h]	333.02	227.91	77.07	91.45	8.49	22.03	119.57	107.84	56.48	65.25	64.57
VOC [g/h]	396.69	271.48	91.81	108.93	10.11	26.24	142.43	128.45	67.27	77.72	76.91

Other Modes

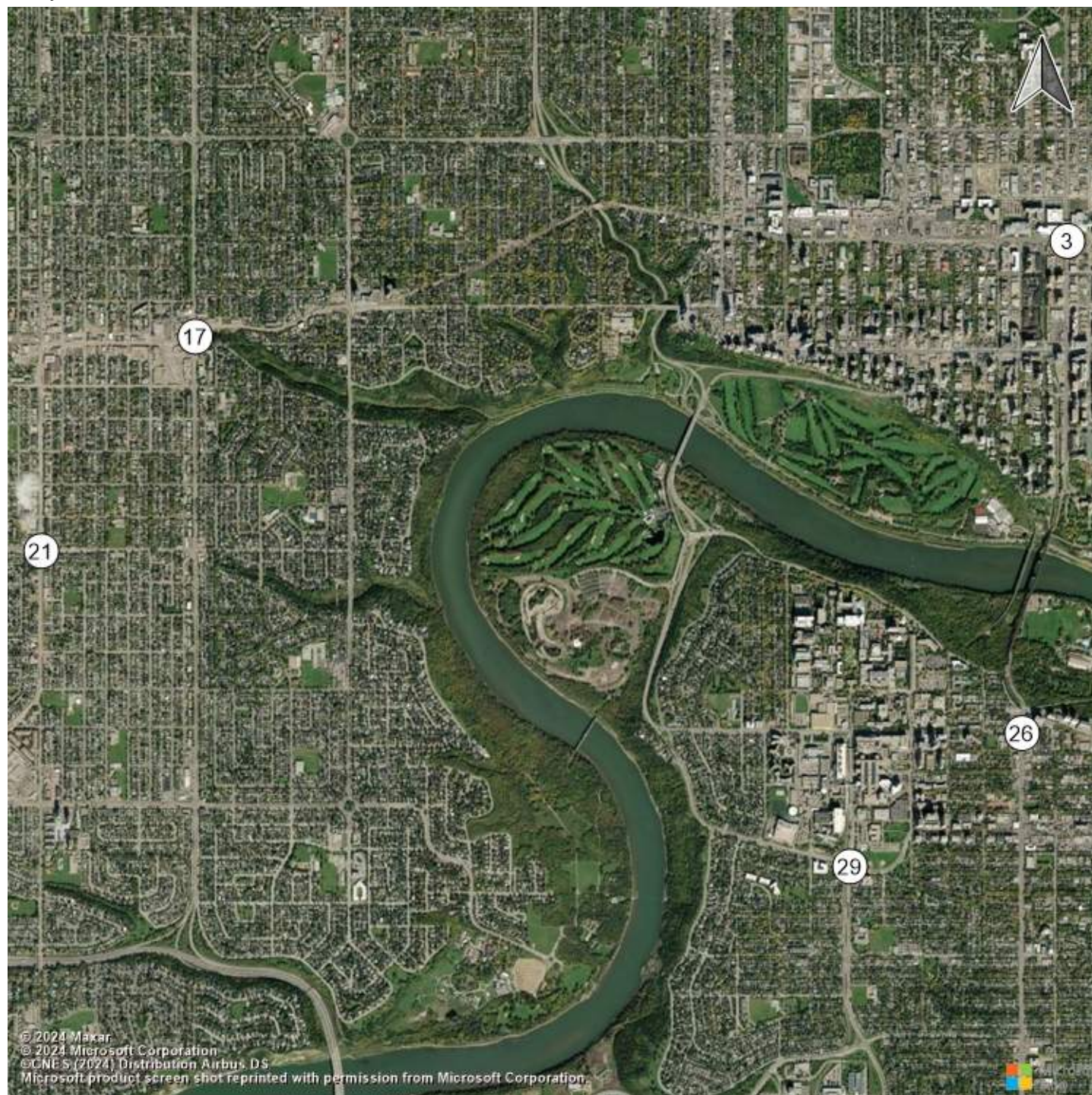
g_Walk,mi, Effective Walk Time [s]	11.0			11.0			13.0			13.0		
M_corner, Corner Circulation Area [m²/ped]	19.71			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	0.00			220.01			0.00			17.68		
d_p, Pedestrian Delay [s]	73.04			73.04			71.18			71.18		
I_p,int, Pedestrian LOS Score for Intersectio	3.006			2.650			4.194			2.682		
Crosswalk LOS	C			B			D			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1159			323			347			406		
d_b, Bicycle Delay [s]	14.79			58.85			57.19			53.13		
I_b,int, Bicycle LOS Score for Intersection	3.397			1.854			2.351			2.051		
Bicycle LOS	C			A			B			B		

Sequence

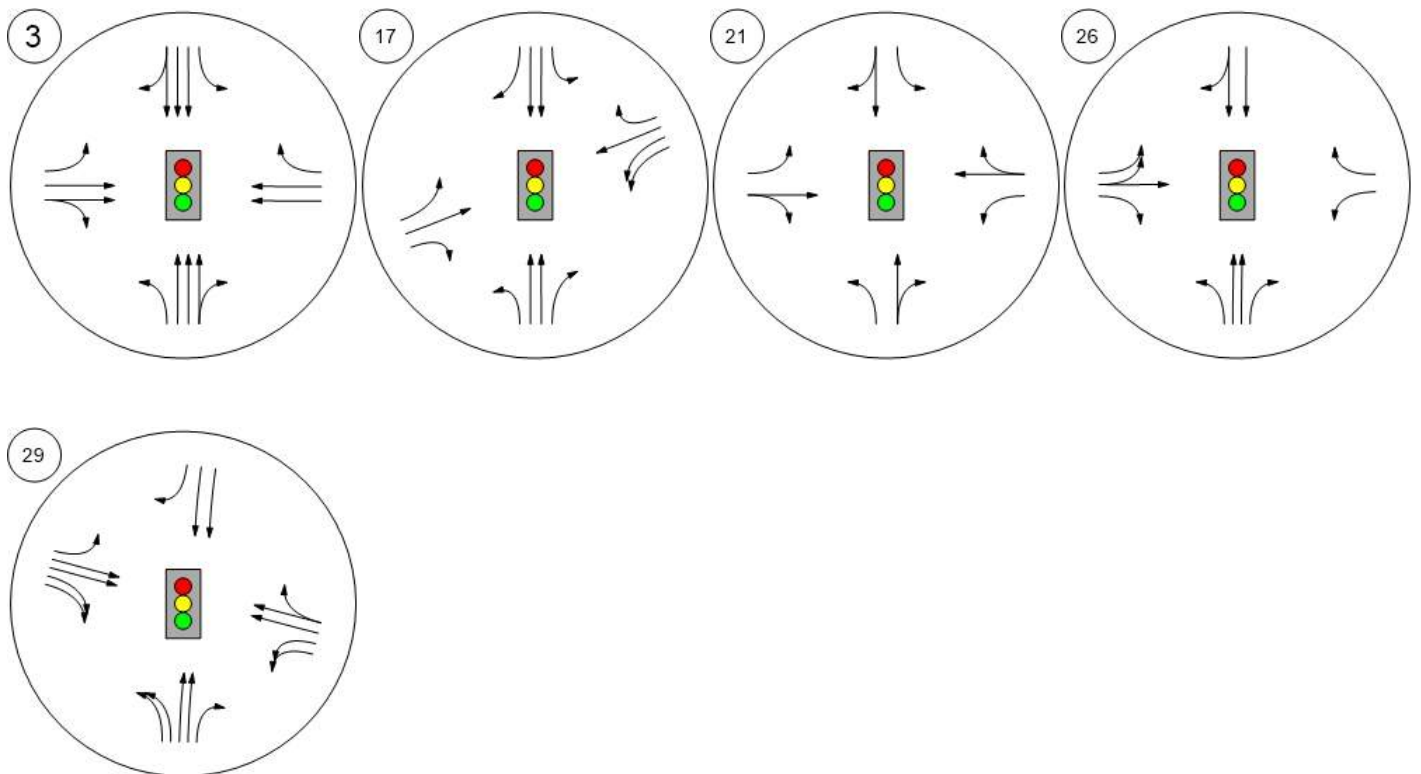
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	6	5	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



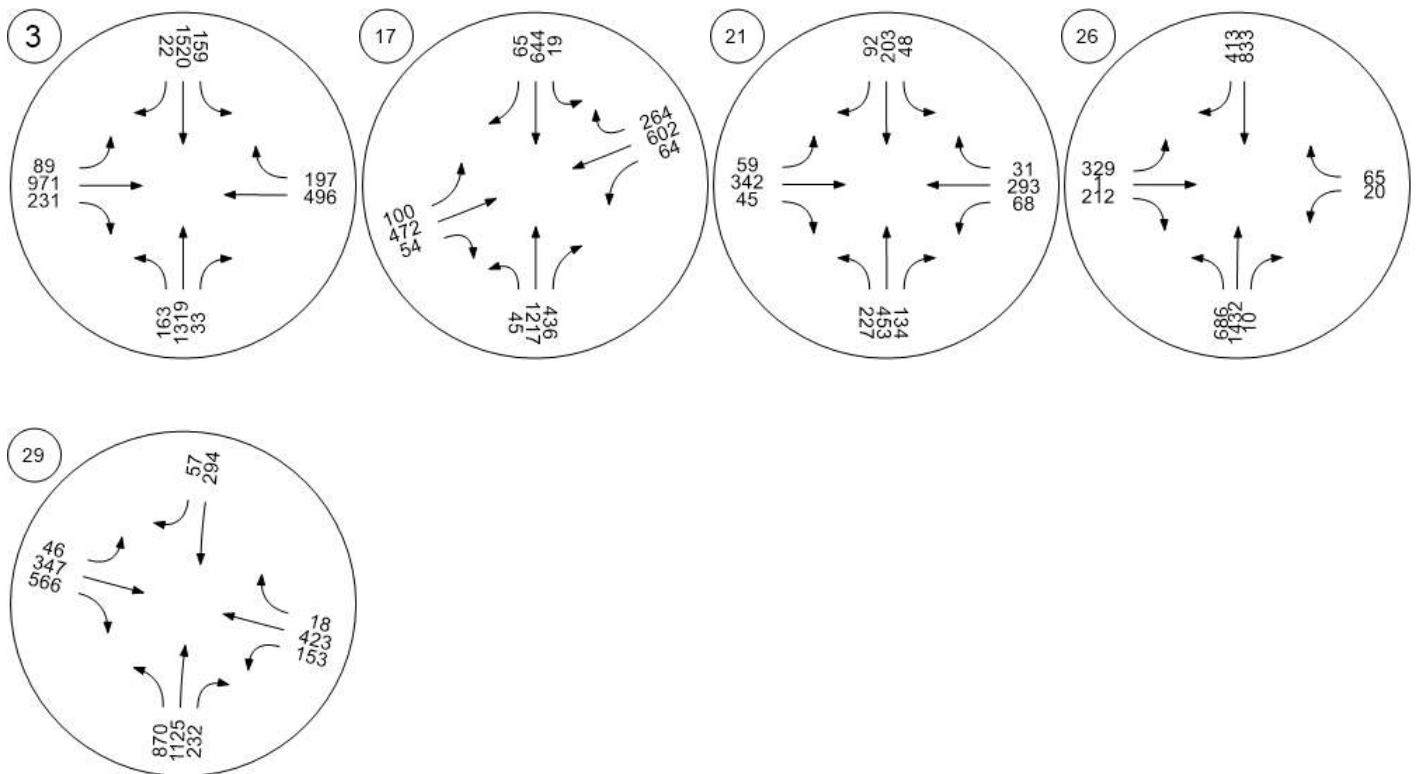
Study Intersections



Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Traffic Conditions

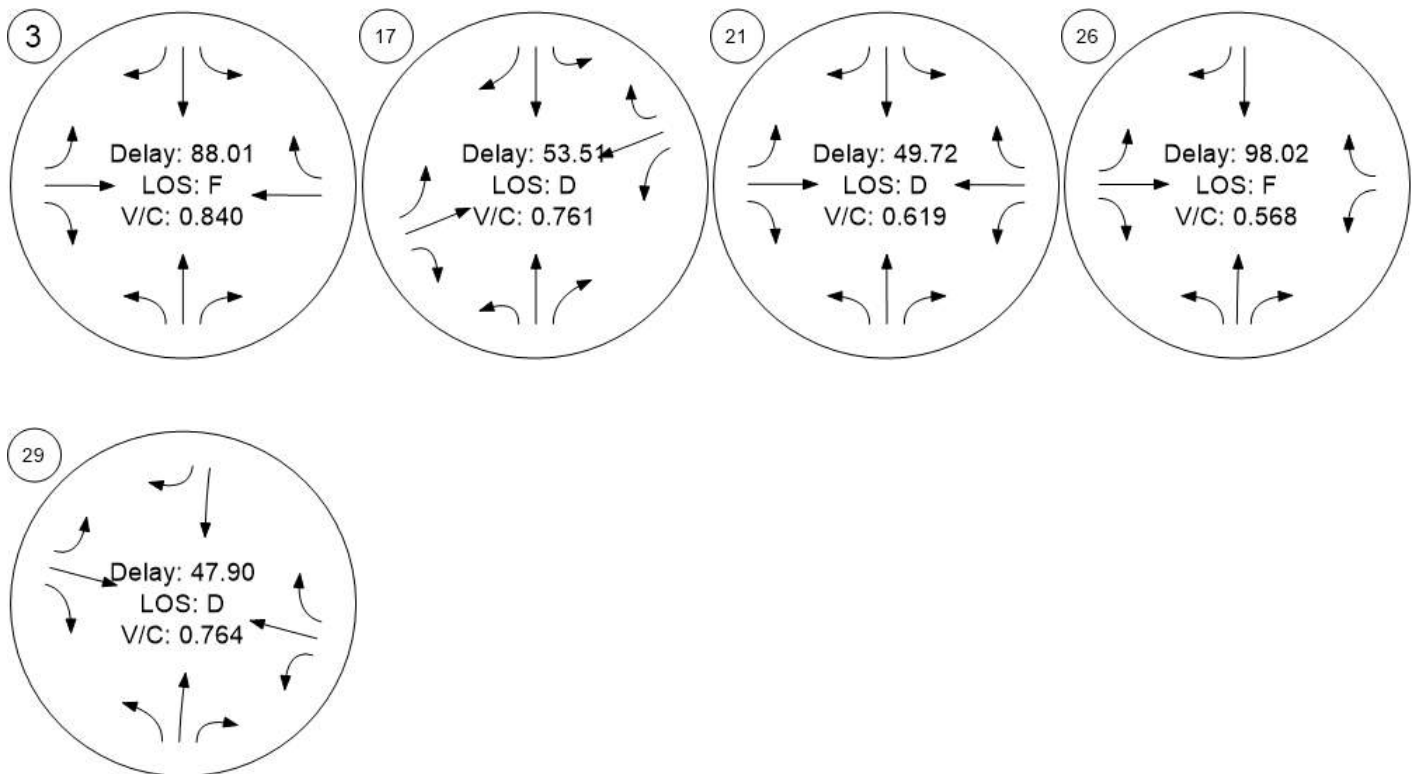


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Priority Growth Areas Mobility Study

Vistro File: Z:\...\Z0016285 PGA Sensitivity Analysis.vistro
Report File: Z:\...\AM Sensitivity Analysis +20% Volume.pdf

Scenario 8 +20% AM
2025-04-24

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	104 Avenue and 109 Street	Signalized	HCM 7th Edition	NB Left	0.899	105.4	F
17	Stony Plain Road and 149 Street	Signalized	HCM 7th Edition	EB Left	0.824	65.6	E
21	95 Avenue and 156 Street	Signalized	HCM 7th Edition	SB Left	0.644	51.9	D
26	109 Street and 87 Ave	Signalized	HCM 7th Edition	EB Right	0.991	110.1	F
29	114 Street and 82 Ave	Signalized	HCM 7th Edition	EB Left	0.778	48.4	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: 104 Avenue and 109 Street

Control Type:	Signalized	Delay (sec / veh):	105.4
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.899

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.66	3.60	3.60
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	0	0	1
Entry Pocket Length [m]	100.00	30.48	30.48	100.00	30.48	30.48	70.00	30.48	30.48	30.48	30.48	55.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	163	1439	33	159	1658	24	89	1060	231	0	541	197
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	2	0	0	23	0	0	20
Total Hourly Volume [veh/h]	163	1439	33	159	1658	24	89	1060	231	0	541	197
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	360	8	40	415	6	22	265	58	0	135	49
Total Analysis Volume [veh/h]	163	1439	33	159	1658	24	89	1060	231	0	541	197
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	49			49			49			49		
v_di, Inbound Pedestrian Volume crossing m	49			49			49			49		
v_co, Outbound Pedestrian Volume crossing	50			50			50			50		
v_ci, Inbound Pedestrian Volume crossing mi	50			50			50			50		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	150
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	4	0	3	4	0	1	5	0	0	2	0
Auxiliary Signal Groups												
Maximum Green [s]	8	40	0	8	40	0	7	81	0	0	68	0
Amber [s]	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	3.0	3.0	0.0	3.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	5.0	5.0	0.0	5.0	5.0	0.0	4.0	5.0	0.0	0.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	22	62	0	22	62	0	17	66	0	0	49	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	0	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No			No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes			Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes			Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	C	R
C, Calculated Cycle Length [s]	150	150	150	150	150	150	150	150	150	150	150
L, Total Lost Time per Cycle [s]	7.00	7.00	7.00	7.00	7.00	7.00	6.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	15	50	50	15	50	50	11	54	54	37	37
g / C, Green / Cycle	0.10	0.33	0.33	0.10	0.33	0.33	0.07	0.36	0.36	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.11	0.33	0.33	0.11	0.37	0.38	0.06	0.39	0.41	0.18	0.16
s, saturation flow rate [veh/h]	1476	2951	1521	1476	2951	1531	1476	1683	1525	2951	1260
c, Capacity [veh/h]	148	984	507	148	984	510	108	606	549	728	311
d1, Uniform Delay [s]	67.50	49.62	49.81	67.50	50.00	50.00	68.54	48.00	48.00	52.12	49.36
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	104.71	25.26	38.15	96.13	69.02	80.55	48.02	64.56	85.03	6.76	9.48
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.10	0.98	0.99	1.08	1.12	1.13	0.82	1.09	1.14	0.74	0.63
d, Delay for Lane Group [s/veh]	172.21	74.89	87.96	163.63	119.02	130.55	116.56	112.56	133.03	58.87	58.84
Lane Group LOS	F	E	F	F	F	F	F	F	F	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	9.96	21.37	24.05	9.61	27.76	30.45	4.82	33.33	33.34	10.11	7.32
50th-Percentile Queue Length [m/ln]	75.93	162.84	183.28	73.25	211.55	232.00	36.75	254.00	254.02	77.03	55.78
95th-Percentile Queue Length [veh/ln]	15.73	28.95	32.10	15.13	39.26	42.76	8.42	45.53	46.85	15.32	11.76
95th-Percentile Queue Length [m/ln]	119.88	220.61	244.56	115.30	299.18	325.85	64.20	346.98	356.98	116.76	89.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	172.21	79.16	87.96	163.63	122.86	130.55	116.56	120.24	133.03	0.00	58.87	58.84
Movement LOS	F	E	F	F	F	F	F	F	F		E	E
d_A, Approach Delay [s/veh]	88.61			126.48			122.14			58.86		
Approach LOS	F			F			F			E		
d_I, Intersection Delay [s/veh]	105.42											
Intersection LOS	F											
Intersection V/C	0.899											

Emissions

Vehicle Kilometers Traveled [km/h]	72.78	432.60	224.64	33.54	233.19	121.64	22.95	170.79	162.12	124.50	45.33
Stops [stops/h]	239.14	1025.77	577.25	230.70	1332.60	730.71	115.76	800.01	800.06	485.20	175.67
Fuel consumption [L/h]	33.91	120.05	68.41	28.40	153.40	85.94	12.77	91.61	97.78	47.26	17.18
CO [g/h]	626.12	2216.89	1263.21	524.50	2832.69	1586.94	235.80	1691.69	1805.66	872.71	317.28
NOx [g/h]	121.82	431.33	245.77	102.05	551.14	308.76	45.88	329.14	351.32	169.80	61.73
VOC [g/h]	145.11	513.79	292.76	121.56	656.50	367.79	54.65	392.07	418.48	202.26	73.53

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	6.01			6.72			9.77			9.62		
d_p, Pedestrian Delay [s]	64.40			64.40			64.40			64.40		
I_p,int, Pedestrian LOS Score for Intersectio	3.135			3.139			2.788			2.759		
Crosswalk LOS	C			C			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	667			667			720			493		
d_b, Bicycle Delay [s]	33.33			33.33			30.72			42.56		
I_b,int, Bicycle LOS Score for Intersection	2.461			2.573			2.717			2.185		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: Stony Plain Road and 149 Street

Control Type:	Signalized	Delay (sec / veh):	65.6
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.824

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [m]	90.00	30.48	30.48	65.00	30.48	75.00	50.00	30.48	15.00	110.00	30.48	75.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	60.00			60.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	45	1327	475	20	644	65	100	472	59	70	656	264
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	48	0	0	7	0	0	6	0	0	26
Total Hourly Volume [veh/h]	45	1327	475	20	644	65	100	472	59	70	656	264
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	332	119	5	161	16	25	118	15	18	164	66
Total Analysis Volume [veh/h]	45	1327	475	20	644	65	100	472	59	70	656	264
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	10			10			10			10		
v_di, Inbound Pedestrian Volume crossing m	10			10			10			10		
v_co, Outbound Pedestrian Volume crossing	10			10			10			10		
v_ci, Inbound Pedestrian Volume crossing mi	10			10			10			10		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	44.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	7	0	5	6	0	1	3	0	1	3	0
Auxiliary Signal Groups												
Maximum Green [s]	0	40	0	8	51	0	11	37	0	11	37	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	30	0	0	30	0	0	30	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	5.0	0.0	1.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	52	0	8	60	0	14	46	0	14	46	0
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No		No	No		No	No		No	No	
Maximum Recall		Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall		Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	5.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	45	45	45	53	53	53	7	39	39	7	39	39
g / C, Green / Cycle	0.38	0.38	0.38	0.44	0.44	0.44	0.06	0.33	0.33	0.06	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.06	0.40	0.30	0.05	0.20	0.04	0.06	0.25	0.04	0.02	0.35	0.17
s, saturation flow rate [veh/h]	734	3279	1589	417	3279	1553	1640	1870	1589	3186	1870	1589
c, Capacity [veh/h]	223	1230	596	174	1448	686	96	608	517	186	608	517
d1, Uniform Delay [s]	38.70	37.50	33.43	27.92	23.27	19.50	56.50	36.57	28.39	54.40	40.50	32.78
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.03	49.84	10.62	1.34	0.99	0.27	104.75	9.42	0.45	5.74	59.79	3.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	1.08	0.80	0.12	0.44	0.09	1.05	0.78	0.11	0.38	1.08	0.51
d, Delay for Lane Group [s/veh]	40.73	87.34	44.04	29.27	24.27	19.78	161.25	45.98	28.84	60.14	100.29	36.37
Lane Group LOS	D	F	D	C	C	B	F	D	C	E	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.22	25.85	13.69	0.38	6.37	1.10	5.68	13.94	1.26	1.17	27.71	6.71
50th-Percentile Queue Length [m/ln]	9.26	196.95	104.35	2.87	48.53	8.35	43.25	106.25	9.63	8.89	211.16	51.12
95th-Percentile Queue Length [veh/ln]	2.19	36.03	19.76	0.68	10.51	1.97	9.71	20.07	2.27	2.10	38.24	10.96
95th-Percentile Queue Length [m/ln]	16.67	274.57	150.59	5.17	80.07	15.03	74.01	152.92	17.33	16.00	291.41	83.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.73	87.34	44.04	29.27	24.27	19.78	161.25	45.98	28.84	60.14	100.29	36.37
Movement LOS	D	F	D	C	C	B	F	D	C	E	F	D
d_A, Approach Delay [s/veh]	75.07			24.00			62.65			80.41		
Approach LOS	E			C			E			F		
d_I, Intersection Delay [s/veh]	65.59											
Intersection LOS	E											
Intersection V/C	0.824											

Emissions

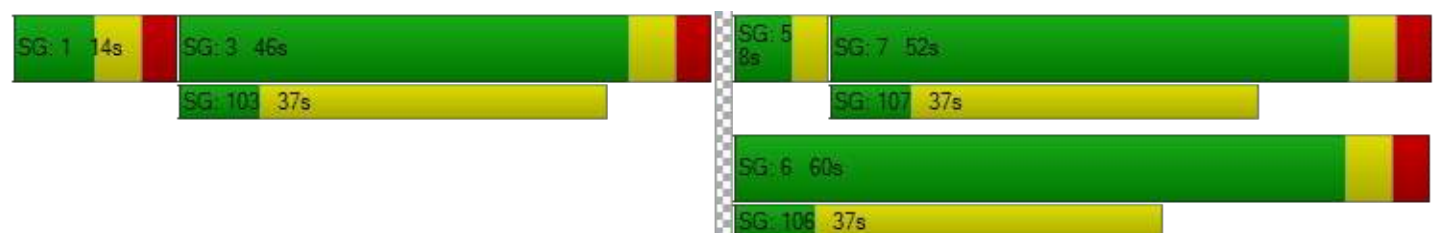
Vehicle Kilometers Traveled [km/h]	11.30	333.30	119.31	4.18	134.50	13.58	23.80	112.35	14.04	25.22	236.38	95.13
Stops [stops/h]	36.45	1550.82	410.81	11.30	382.12	32.87	170.27	418.31	37.90	69.98	831.35	201.27
Fuel consumption [L/h]	3.57	168.36	39.76	1.18	36.08	3.23	18.50	36.79	3.50	7.21	91.81	20.96
CO [g/h]	65.97	3108.82	734.22	21.77	666.24	59.70	341.68	679.38	64.58	133.18	1695.38	387.06
NOx [g/h]	12.83	604.86	142.85	4.24	129.63	11.61	66.48	132.18	12.56	25.91	329.86	75.31
VOC [g/h]	15.29	720.50	170.16	5.05	154.41	13.84	79.19	157.45	14.97	30.87	392.92	89.71

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			92.53			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	56.17			32.22			53.57			21.74		
d_p, Pedestrian Delay [s]	49.50			49.50			49.50			49.50		
I_p,int, Pedestrian LOS Score for Intersectio	2.969			2.972			2.530			2.692		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	750			883			650			650		
d_b, Bicycle Delay [s]	23.44			18.70			27.34			27.34		
I_b,int, Bicycle LOS Score for Intersection	3.123			2.167			2.611			3.236		
Bicycle LOS	C			B			B			C		

Sequence

Ring 1	1	3	5	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: 95 Avenue and 156 Street

Control Type:	Signalized	Delay (sec / veh):	51.9
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [m]	75.00	30.48	30.48	75.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	227	494	134	53	203	92	65	342	45	68	293	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	13	0	0	9	0	0	5	0	0	3
Total Hourly Volume [veh/h]	227	494	134	53	203	92	65	342	45	68	293	31
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	124	34	13	51	23	16	86	11	17	73	8
Total Analysis Volume [veh/h]	227	494	134	53	203	92	65	342	45	68	293	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	20			20			20			20		
v_di, Inbound Pedestrian Volume crossing m	20			20			20			20		
v_co, Outbound Pedestrian Volume crossing	20			20			20			20		
v_ci, Inbound Pedestrian Volume crossing mi	20			20			20			20		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	40.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	2	3	0	1	5	0	7	9	0	7	9	0
Auxiliary Signal Groups												
Maximum Green [s]	22	42	0	12	32	0	7	31	0	7	31	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	30	0	0	30	0	0	30	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	3.0	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	26	56	0	12	42	0	8	44	0	8	44	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	0.00	3.00
g_i, Effective Green Time [s]	21	46	7	32	47	34	47	34
g / C, Green / Cycle	0.18	0.38	0.06	0.27	0.39	0.28	0.39	0.28
(v / s)_i Volume / Saturation Flow Rate	0.14	0.35	0.03	0.17	0.05	0.23	0.06	0.19
s, saturation flow rate [veh/h]	1640	1788	1640	1744	1192	1671	1147	1680
c, Capacity [veh/h]	287	685	96	465	374	473	321	476
d1, Uniform Delay [s]	47.40	35.17	54.98	38.84	25.00	40.11	26.17	38.18
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.61	19.07	21.13	6.46	1.01	14.48	1.50	7.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.92	0.55	0.63	0.17	0.82	0.21	0.68
d, Delay for Lane Group [s/veh]	67.01	54.23	76.11	45.30	26.01	54.59	27.67	45.84
Lane Group LOS	E	D	E	D	C	D	C	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	8.04	20.69	2.12	8.47	1.28	12.46	1.36	9.43
50th-Percentile Queue Length [m/ln]	61.24	157.64	16.16	64.56	9.75	94.94	10.39	71.82
95th-Percentile Queue Length [veh/ln]	12.69	28.15	3.82	13.25	2.30	18.25	2.46	14.46
95th-Percentile Queue Length [m/ln]	96.67	214.49	29.08	100.94	17.54	139.05	18.71	110.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	67.01	54.23	54.23	76.11	45.30	45.30	26.01	54.59	54.59	27.67	45.84	45.84
Movement LOS	E	D	D	E	D	D	C	D	D	C	D	D
d_A, Approach Delay [s/veh]	57.63			49.99			50.48			42.69		
Approach LOS	E			D			D			D		
d_I, Intersection Delay [s/veh]	51.89											
Intersection LOS	D											
Intersection V/C	0.644											

Emissions

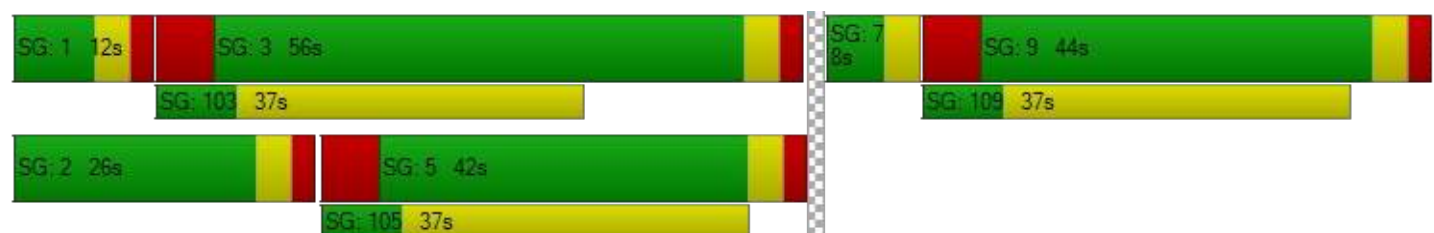
Vehicle Kilometers Traveled [km/h]	57.37	158.71	18.01	100.24	18.60	110.71	23.38	111.41
Stops [stops/h]	241.10	620.65	63.61	254.18	38.37	373.79	40.92	282.76
Fuel consumption [L/h]	22.58	55.26	6.25	25.53	3.93	35.19	4.59	28.38
CO [g/h]	417.00	1020.34	115.36	471.46	72.61	649.83	84.79	524.11
NOx [g/h]	81.13	198.52	22.45	91.73	14.13	126.43	16.50	101.97
VOC [g/h]	96.64	236.47	26.74	109.27	16.83	150.60	19.65	121.47

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	27.17	28.00	21.79	18.60
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.402	2.314	2.424	2.386
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	767	533	567	567
d_b, Bicycle Delay [s]	22.82	32.27	30.82	30.82
I_b,int, Bicycle LOS Score for Intersection	2.992	2.149	2.314	2.211
Bicycle LOS	C	B	B	B

Sequence

Ring 1	1	3	7	9	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: 109 Street and 87 Ave

Control Type:	Signalized	Delay (sec / veh):	110.1
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.991

Intersection Setup

Name	109 Street				109 Street				87 Ave			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration												
Turning Movement	Left	Thru	Thru	Right	Left	Left	Thru	Right	Left	Left	Thru	Right
Lane Width [m]	3.20	3.66	3.20	4.00	3.66	3.66	3.60	4.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Entry Pocket Length [m]	80.00	30.48	30.48	35.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	45.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00				50.00				50.00			
Grade [%]	0.00				0.00				0.00			
Curb Present	Yes				Yes				Yes			
Crosswalk	Yes				Yes				Yes			

Volumes

Name	109 Street				109 Street				87 Ave			
Base Volume Input [veh/h]	686	1562	0	10	0	0	833	450	359	0	1	232
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	1	0	0	0	45	0	0	0	23
Total Hourly Volume [veh/h]	686	1562	0	9	0	0	833	405	359	0	1	209
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	172	391	0	2	0	0	208	101	90	0	0	52
Total Analysis Volume [veh/h]	686	1562	0	9	0	0	833	405	359	0	1	209
Presence of On-Street Parking	No			No	No			No	No			No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	53				0				13			
v_di, Inbound Pedestrian Volume crossing th	52				0				14			
v_co, Outbound Pedestrian Volume along th	16				14				52			
v_ci, Inbound Pedestrian Volume along the l	16				13				53			
v_ab, Corner Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycles/h]	25				6				5			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	200
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	85.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Overlap	Overlap	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	1	0	3	0	0	1	0	0	0	3	2
Auxiliary Signal Groups	1,2	1,2		1,3								
Maximum Green [s]	30	59	0	26	0	0	59	0	0	0	26	30
Amber [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
All red [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
Walk [s]	0	8	0	7	0	0	8	0	0	0	7	0
Pedestrian Clearance [s]	0	16	0	19	0	0	16	0	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk												
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	61	84	0	25	0	0	84	0	0	0	25	61
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	24	0	7	0	0	24	0	0	0	7	5
Vehicle Extension [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Minimum Recall	No	Yes		No			Yes				No	
Maximum Recall	Yes	No		No			No				No	
Pedestrian Recall	No	No		Yes			No				Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	C	R	C	C	L	C	R
C, Calculated Cycle Length [s]	200	200	200	200	200	200	200	200
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	140	140	134	79	79	20	20	20
g / C, Green / Cycle	0.70	0.70	0.67	0.40	0.40	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.73	0.49	0.01	0.37	0.40	0.13	0.19	0.15
s, saturation flow rate [veh/h]	943	3204	1436	1683	1541	1210	1082	1397
c, Capacity [veh/h]	534	2247	963	667	610	145	144	140
d1, Uniform Delay [s]	64.91	17.43	10.96	57.69	60.39	93.24	93.24	89.77
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.41	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	142.07	1.80	0.02	21.17	39.98	86.40	226.52	256.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.29	0.70	0.01	0.93	1.01	1.07	1.42	1.50
d, Delay for Lane Group [s/veh]	206.98	19.24	10.97	78.86	100.37	179.64	319.76	346.53
Lane Group LOS	F	B	B	E	F	F	F	F
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	32.00	21.38	0.14	33.89	37.72	11.11	16.65	17.26
50th-Percentile Queue Length [m/ln]	243.83	162.95	1.10	258.24	287.40	84.62	126.88	131.50
95th-Percentile Queue Length [veh/ln]	49.64	28.97	0.26	43.44	48.31	17.01	26.36	27.50
95th-Percentile Queue Length [m/ln]	378.23	220.74	1.98	330.99	368.12	129.63	200.83	209.54

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	206.98	19.24	0.00	10.97	0.00	0.00	84.39	100.37	259.37	0.00	319.76	346.53
Movement LOS	F	B		B			F	F	F		F	F
d_A, Approach Delay [s/veh]	76.27				89.62				291.50			
Approach LOS	E				F				F			
d_I, Intersection Delay [s/veh]	110.14											
Intersection LOS	F											
Intersection V/C	0.991											

Emissions

Vehicle Kilometers Traveled [km/h]	72.47	165.02	0.95	64.09	64.09	30.52	40.52	41.25
Stops [stops/h]	575.99	769.83	2.59	610.01	678.91	199.90	299.72	310.62
Fuel consumption [L/h]	129.17	56.12	0.22	57.38	69.18	28.79	61.14	66.67
CO [g/h]	2385.15	1036.23	4.15	1059.54	1277.42	531.56	1129.07	1231.10
NOx [g/h]	464.06	201.61	0.81	206.15	248.54	103.42	219.68	239.53
VOC [g/h]	552.78	240.16	0.96	245.56	296.05	123.19	261.67	285.32

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0				11.0				11.0			
M_corner, Corner Circulation Area [m²/ped]	18.16				210.96				0.00			
M_CW, Crosswalk Circulation Area [m²/ped]	2.98				0.00				0.00			
d_p, Pedestrian Delay [s]	89.30				89.30				89.30			
I_p,int, Pedestrian LOS Score for Intersectio	3.083				2.464				2.701			
Crosswalk LOS	C				B				B			
s_b, Saturation Flow Rate of the bicycle lane	2000				2000				2000			
c_b, Capacity of the bicycle lane [bicycles/h]	1400				790				200			
d_b, Bicycle Delay [s]	9.11				36.71				81.20			
I_b,int, Bicycle LOS Score for Intersection	3.422				2.618				2.536			
Bicycle LOS	C				B				B			

Intersection Setup

Name	87 Ave							
Approach	Westbound				Southwestbound			
Lane Configuration								
Turning Movement	Left	Thru	Right	Right	Left	Thru	Right	Right
Lane Width [m]	3.50	3.66	3.50	3.66	3.66	3.66	3.66	3.66
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0
Entry Pocket Length [m]	30.48	30.48	30.48	10.00	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	30.00				50.00			
Grade [%]	0.00				0.00			
Curb Present	Yes							
Crosswalk	Yes				Yes			

Volumes

Name	87 Ave							
Base Volume Input [veh/h]	20	0	0	65	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00							
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	7	0	0	0	0
Total Hourly Volume [veh/h]	20	0	0	58	0	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	0	15	0	0	0	0
Total Analysis Volume [veh/h]	20	0	0	58	0	0	0	0
Presence of On-Street Parking	No			No				
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	16				0			
v_di, Inbound Pedestrian Volume crossing th	16				0			
v_co, Outbound Pedestrian Volume along th	0				0			
v_ci, Inbound Pedestrian Volume along the l	0				0			
v_ab, Corner Pedestrian Volume [ped/h]	0				0			
Bicycle Volume [bicycles/h]	0				0			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	200
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	85.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	3	0	0	0	0	0	0	0
Auxiliary Signal Groups								
Maximum Green [s]	26	0	0	0	0	0	0	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All red [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk [s]	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	19	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk								
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	25	0	0	0	0	0	0	0
Lead / Lag	Lag	-	-	-	-	-	-	-
Minimum Green [s]	7	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No							
Maximum Recall	No							
Pedestrian Recall	Yes							

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	R	
C, Calculated Cycle Length [s]	200	200	
L, Total Lost Time per Cycle [s]	5.00	5.00	
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	
l2, Clearance Lost Time [s]	3.00	3.00	
g_i, Effective Green Time [s]	20	20	
g / C, Green / Cycle	0.10	0.10	
(v / s)_i Volume / Saturation Flow Rate	0.02	0.04	
s, saturation flow rate [veh/h]	1054	1431	
c, Capacity [veh/h]	36	143	
d1, Uniform Delay [s]	100.00	84.42	
k, delay calibration	0.11	0.11	
l, Upstream Filtering Factor	1.00	1.00	
d2, Incremental Delay [s]	12.70	1.84	
d3, Initial Queue Delay [s]	0.00	0.00	
Rp, platoon ratio	1.00	1.00	
PF, progression factor	1.00	1.00	

Lane Group Results

X, volume / capacity	0.56	0.41	
d, Delay for Lane Group [s/veh]	112.70	86.26	
Lane Group LOS	F	F	
Critical Lane Group	No	No	
50th-Percentile Queue Length [veh/ln]	1.19	2.95	
50th-Percentile Queue Length [m/ln]	9.07	22.50	
95th-Percentile Queue Length [veh/ln]	2.14	5.31	
95th-Percentile Queue Length [m/ln]	16.33	40.49	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	112.70	0.00	0.00	86.26	0.00	0.00	0.00	0.00
Movement LOS	F			F				
d_A, Approach Delay [s/veh]	93.04				0.00			
Approach LOS	F				A			
d_I, Intersection Delay [s/veh]	110.14							
Intersection LOS	F							
Intersection V/C	0.991							

Emissions

Vehicle Kilometers Traveled [km/h]	0.73	2.11	
Stops [stops/h]	21.43	53.14	
Fuel consumption [L/h]	2.00	4.53	
CO [g/h]	36.86	83.73	
NOx [g/h]	7.17	16.29	
VOC [g/h]	8.54	19.41	

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	19.20	0.00
d_p, Pedestrian Delay [s]	89.30	89.30
I_p,int, Pedestrian LOS Score for Intersectio	2.007	3.302
Crosswalk LOS	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	200	0
d_b, Bicycle Delay [s]	81.00	100.00
I_b,int, Bicycle LOS Score for Intersection	1.560	4.132
Bicycle LOS	A	D

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 29: 114 Street and 82 Ave

Control Type:	Signalized	Delay (sec / veh):	48.4
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.778

Intersection Setup

Name	114 Street			114 Street			University Ave			82 Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵			↵↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.70	3.60	3.66	3.60	3.60	4.00	3.60	3.60	3.66	3.66	3.66
No. of Lanes in Entry Pocket	2	0	1	0	0	1	1	0	1	2	0	0
Entry Pocket Length [m]	170.00	30.48	2.00	30.48	30.48	105.00	95.00	30.48	95.00	100.00	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	114 Street			114 Street			University Ave			82 Ave		
Base Volume Input [veh/h]	870	1228	253	0	294	62	46	347	566	153	423	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	25	0	0	6	0	0	0	0	0	2
Total Hourly Volume [veh/h]	870	1228	228	0	294	62	46	347	566	153	423	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	218	307	57	0	74	16	12	87	142	38	106	5
Total Analysis Volume [veh/h]	870	1228	228	0	294	62	46	347	566	153	423	18
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			2			2			2		
v_di, Inbound Pedestrian Volume crossing m	2			2			2			2		
v_co, Outbound Pedestrian Volume crossing	18			0			0			18		
v_ci, Inbound Pedestrian Volume crossing mi	18			0			0			18		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	190
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Overlap	Permiss	Permiss	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	2	1	0	0	1	2	3	6	2	5	4	0
Auxiliary Signal Groups		1,2				1,2			2,6			
Maximum Green [s]	60	33	0	0	33	60	15	38	60	16	38	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	3.0	3.0	0.0	0.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	0	9	0	0	9	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	22	0	0	22	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	0.0	0.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	0.0
Detector Location [m]	1.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0
Detector Length [m]	5.0	5.0	0.0	0.0	5.0	5.0	5.0	0.0	0.0	5.0	5.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	70	33	0	0	33	70	46	36	70	51	41	0
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	10	27	0	0	27	10	7	29	10	7	29	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Minimum Recall	No	Yes			Yes	No	No	No	No	No	No	
Maximum Recall	No	No			No	No	No	Yes	No	No	Yes	
Pedestrian Recall	No	No			No	No	No	No	No	No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	R	L	C	C
C, Calculated Cycle Length [s]	167	167	167	167	167	167	167	167	167	167	167
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	4.00	4.00	0.00	5.00	5.00	0.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	60	99	33	33	99	6	38	104	10	42	42
g / C, Green / Cycle	0.36	0.59	0.20	0.20	0.59	0.04	0.23	0.62	0.06	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.37	0.38	0.16	0.09	0.05	0.03	0.12	0.24	0.05	0.14	0.14
s, saturation flow rate [veh/h]	2342	3204	1431	3204	1318	1535	2951	2329	3113	1550	1527
c, Capacity [veh/h]	855	1895	282	632	779	58	670	1447	193	390	384
d1, Uniform Delay [s]	56.13	22.65	64.18	59.40	14.66	79.88	56.67	15.85	77.43	54.75	54.77
k, delay calibration	0.11	0.40	0.28	0.11	0.11	0.11	0.50	0.11	0.11	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.77	1.37	13.15	0.53	0.04	20.96	2.85	0.17	7.11	5.93	6.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.02	0.65	0.81	0.47	0.08	0.79	0.52	0.39	0.79	0.57	0.57
d, Delay for Lane Group [s/veh]	74.90	24.02	77.33	59.93	14.71	100.84	59.52	16.02	84.54	60.68	60.83
Lane Group LOS	F	C	E	E	B	F	E	B	F	E	E
Critical Lane Group	Yes	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	20.71	16.34	10.36	5.61	1.05	2.32	6.75	5.52	3.46	8.89	8.80
50th-Percentile Queue Length [m/ln]	157.80	124.53	78.92	42.77	8.03	17.68	51.46	42.02	26.39	67.74	67.04
95th-Percentile Queue Length [veh/ln]	28.51	22.97	15.64	9.50	1.90	4.18	11.02	9.37	6.23	13.78	13.66
95th-Percentile Queue Length [m/ln]	217.23	175.05	119.14	72.37	14.45	31.83	83.93	71.37	47.51	105.01	104.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	74.90	24.02	77.33	0.00	59.93	14.71	100.84	59.52	16.02	84.54	60.75	60.83
Movement LOS	F	C	E		E	B	F	E	B	F	E	E
d_A, Approach Delay [s/veh]	48.28			52.06			35.83			66.88		
Approach LOS	D			D			D			E		
d_I, Intersection Delay [s/veh]	48.39											
Intersection LOS	D											
Intersection V/C	0.778											

Emissions

Vehicle Kilometers Traveled [km/h]	246.27	347.60	64.54	67.96	14.33	15.12	114.09	186.10	25.38	36.81	36.36
Stops [stops/h]	890.97	703.13	222.80	241.47	22.67	49.92	290.54	237.27	149.01	191.25	189.24
Fuel consumption [L/h]	93.61	71.57	24.72	25.45	2.57	6.13	33.28	30.02	15.72	18.16	17.97
CO [g/h]	1728.50	1321.60	456.43	470.02	47.54	113.22	614.55	554.25	290.28	335.34	331.85
NOx [g/h]	336.30	257.14	88.81	91.45	9.25	22.03	119.57	107.84	56.48	65.25	64.57
VOC [g/h]	400.60	306.29	105.78	108.93	11.02	26.24	142.43	128.45	67.27	77.72	76.91

Other Modes

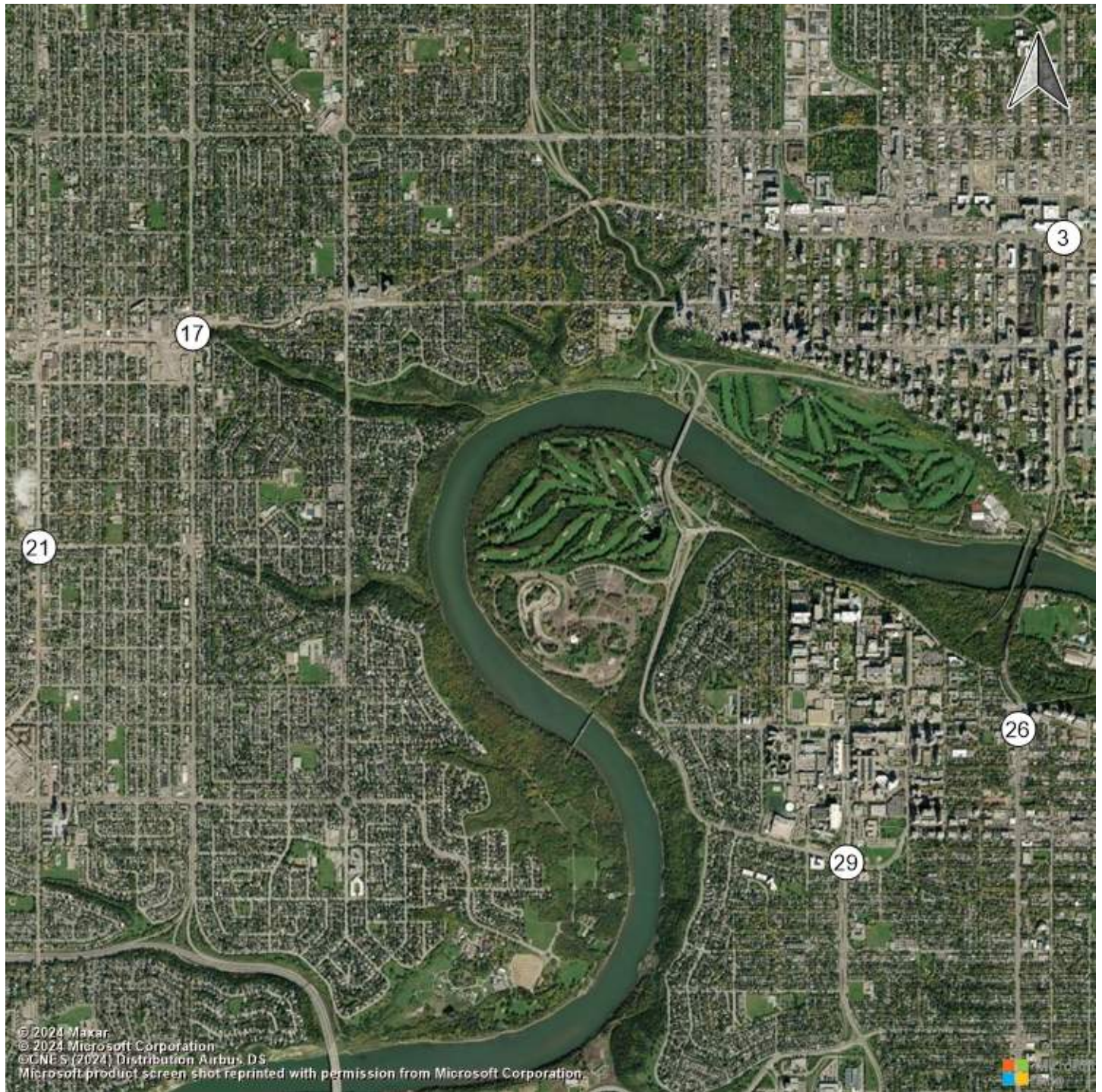
g_Walk,mi, Effective Walk Time [s]	11.0	11.0	13.0	13.0
M_corner, Corner Circulation Area [m²/ped]	19.71	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	0.00	220.01	0.00	16.61
d_p, Pedestrian Delay [s]	73.04	73.04	71.18	71.18
I_p,int, Pedestrian LOS Score for Intersectio	3.014	2.672	4.194	2.685
Crosswalk LOS	C	B	D	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1159	323	347	406
d_b, Bicycle Delay [s]	14.79	58.85	57.19	53.13
I_b,int, Bicycle LOS Score for Intersection	3.499	1.858	2.351	2.051
Bicycle LOS	C	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	6	5	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



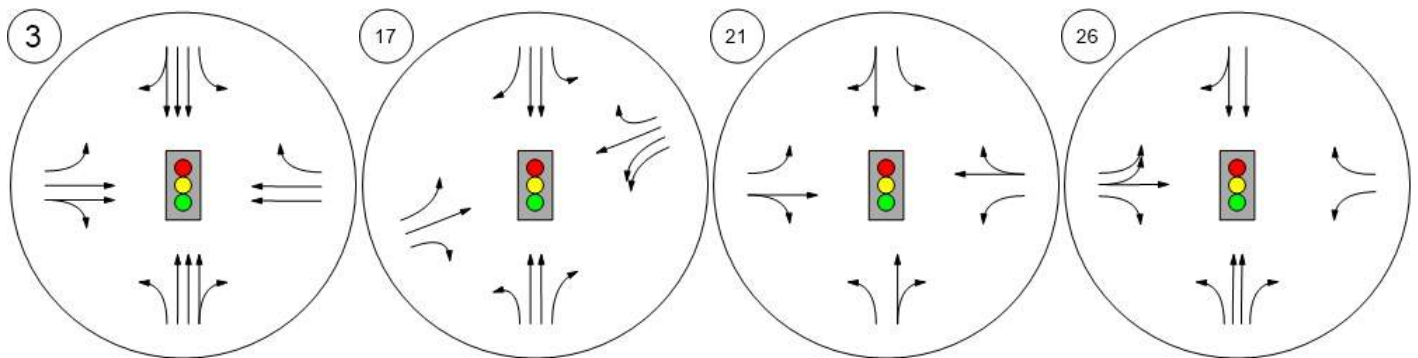
Study Intersections



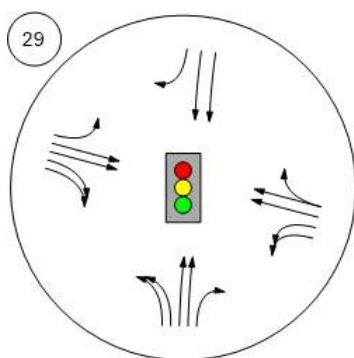
Lane Configuration and Traffic Control



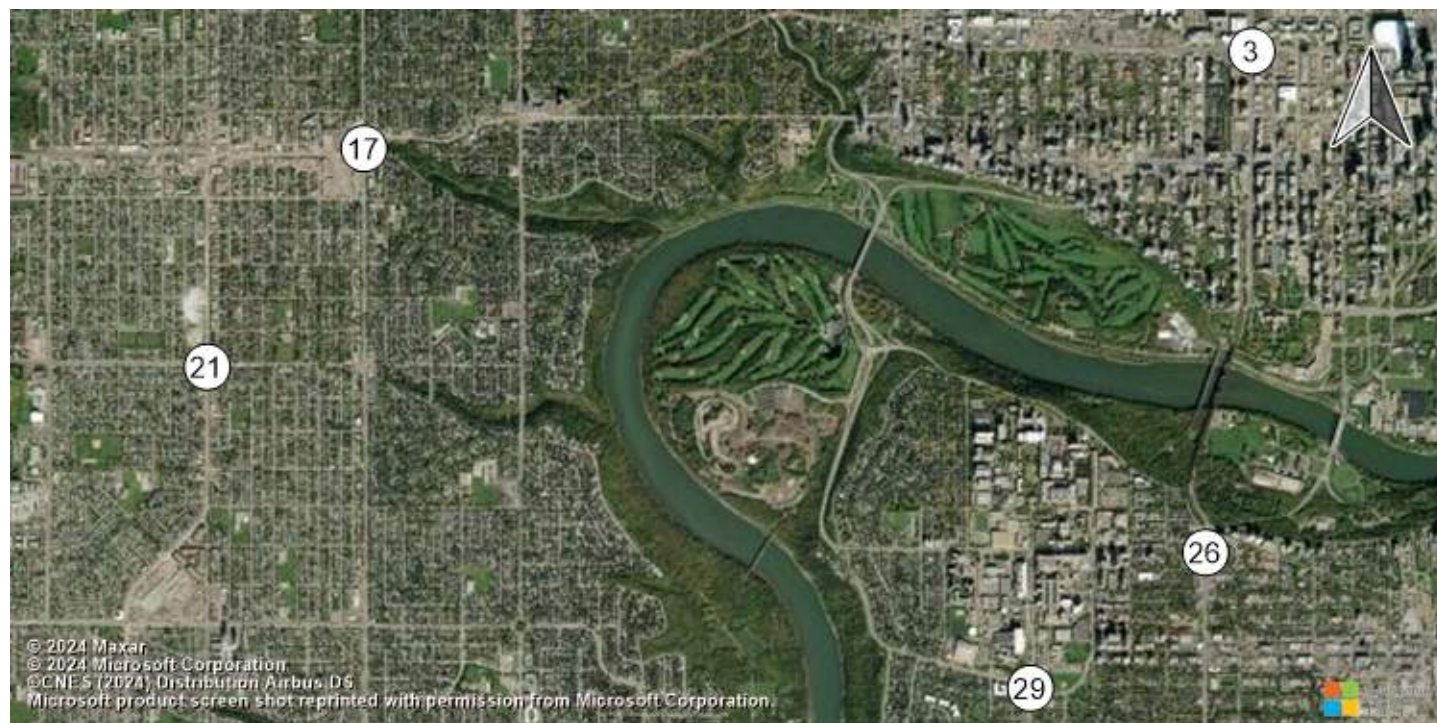
104 Avenue and 109 Street Stony Plain Road and 149 Str 95 Avenue and 156 Street 109 Street and 87 Ave



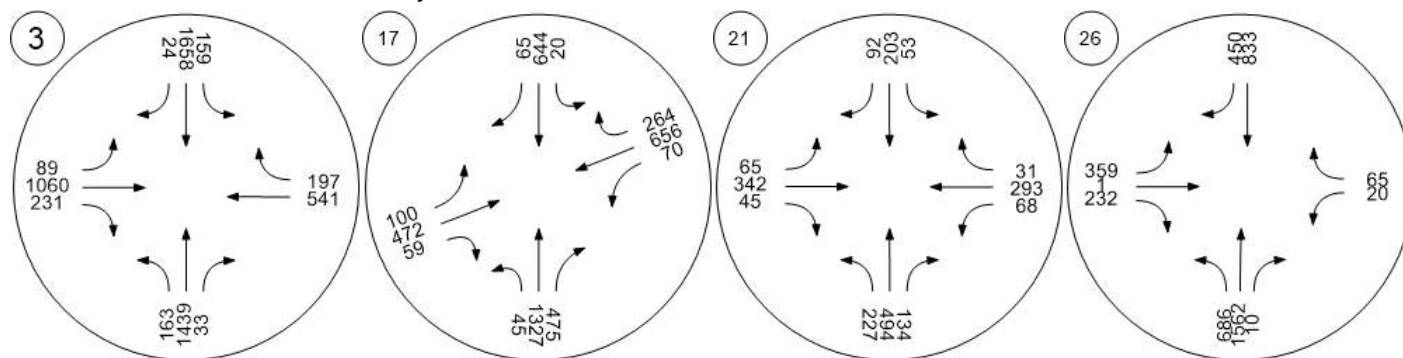
114 Street and 82 Ave



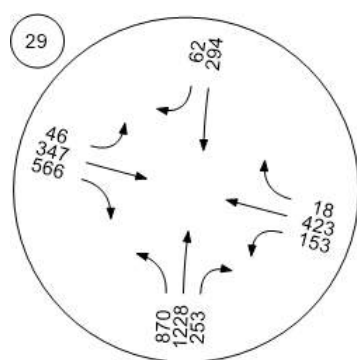
Traffic Volume - Base Volume



104 Avenue and 109 Street Stony Plain Road and 149 Str 95 Avenue and 156 Street 109 Street and 87 Ave



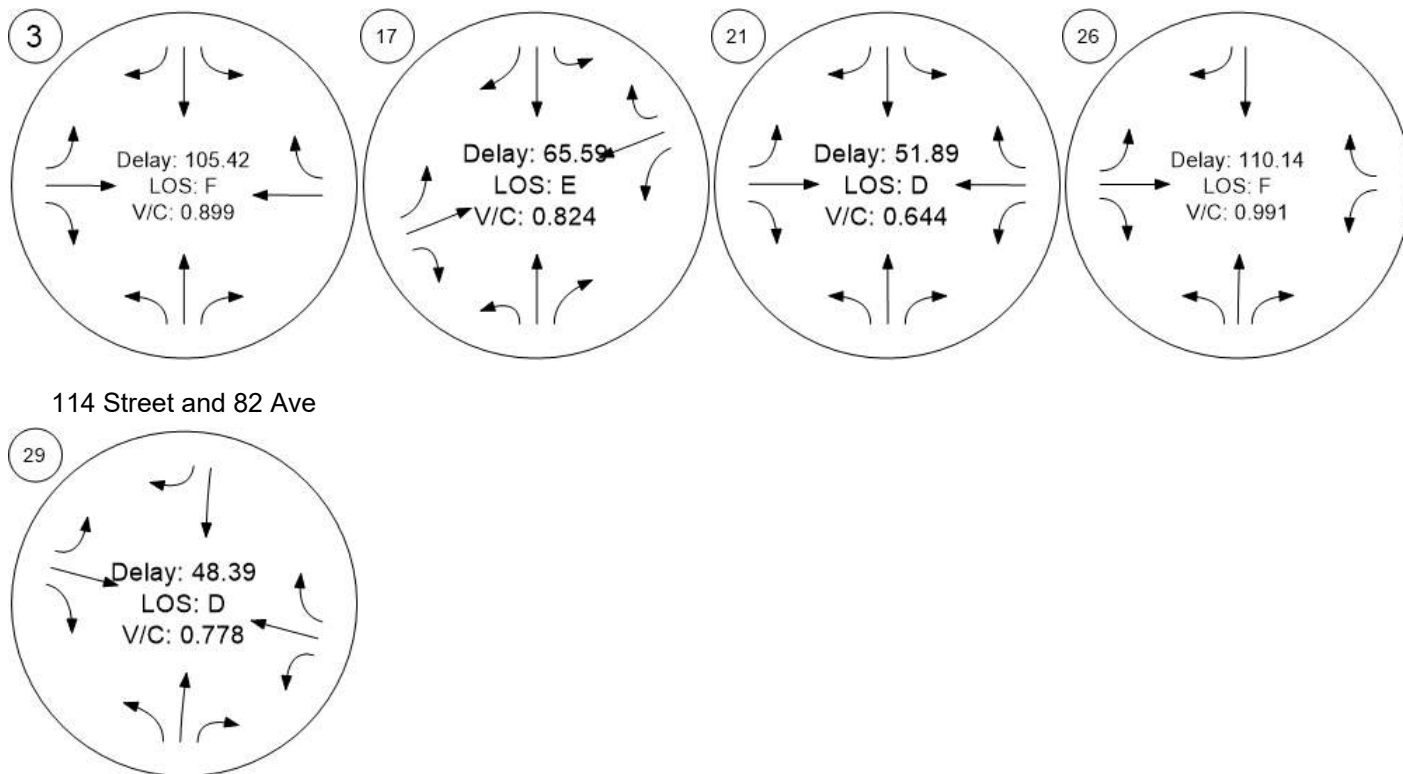
114 Street and 82 Ave



Traffic Conditions



104 Avenue and 109 Street Stony Plain Road and 149 Str 95 Avenue and 156 Street 109 Street and 87 Ave



J

Appendix J HCM Sensitivity Analysis – PM Peak



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Priority Growth Areas Mobility Study

Vistro File: Z:\...\Z0016285 PGA Sensitivity Analysis.vistro
Report File: Z:\...\PM Sensitivity Analysis +10% Volume.pdf

Scenario 7 +10% PM
2025-04-24

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	104 Avenue and 109 Street	Signalized	HCM 7th Edition	NB Left	0.939	137.0	F
17	Stony Plain Road and 149 Street	Signalized	HCM 7th Edition	WB Thru	0.791	78.3	E
21	95 Avenue and 156 Street	Signalized	HCM 7th Edition	NB Left	0.708	58.3	E
26	109 Street and 87 Ave	Signalized	HCM 7th Edition	SB Thru	1.083	230.6	F
29	114 Street and 82 Ave	Signalized	HCM 7th Edition	SB Thru	0.748	94.9	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: 104 Avenue and 109 Street

Control Type:	Signalized	Delay (sec / veh):	137.0
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.939

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.66	3.60	3.60
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	0	0	1
Entry Pocket Length [m]	100.00	30.48	30.48	100.00	30.48	30.48	70.00	30.48	30.48	30.48	30.48	55.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	180	1536	28	158	1401	172	152	372	110	0	759	438
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	17	0	0	11	0	0	44
Total Hourly Volume [veh/h]	180	1536	28	158	1401	172	152	372	110	0	759	438
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	45	384	7	40	350	43	38	93	28	0	190	110
Total Analysis Volume [veh/h]	180	1536	28	158	1401	172	152	372	110	0	759	438
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	50			50			50			50		
v_di, Inbound Pedestrian Volume crossing m	50			50			50			50		
v_co, Outbound Pedestrian Volume crossing	50			50			50			50		
v_ci, Inbound Pedestrian Volume crossing mi	50			50			50			50		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	160
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	4	0	3	4	0	1	5	0	0	2	0
Auxiliary Signal Groups												
Maximum Green [s]	17	43	0	17	43	0	13	69	0	0	50	0
Amber [s]	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	3.0	3.0	0.0	3.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	5.0	5.0	0.0	5.0	5.0	0.0	4.0	5.0	0.0	0.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	23	60	0	23	60	0	20	77	0	0	57	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	0	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No			No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes			Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes			Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	C	R
C, Calculated Cycle Length [s]	160	160	160	160	160	160	160	160	160	160	160
L, Total Lost Time per Cycle [s]	7.00	7.00	7.00	7.00	7.00	7.00	6.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	16	48	48	16	48	48	14	65	65	45	45
g / C, Green / Cycle	0.10	0.30	0.30	0.10	0.30	0.30	0.09	0.41	0.41	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.12	0.35	0.35	0.11	0.36	0.37	0.10	0.15	0.16	0.26	0.34
s, saturation flow rate [veh/h]	1476	2951	1526	1476	2951	1408	1476	1683	1492	2951	1278
c, Capacity [veh/h]	148	885	458	148	885	422	129	684	606	830	359
d1, Uniform Delay [s]	72.00	56.00	56.00	72.00	56.00	56.00	73.00	33.11	33.41	55.64	55.20
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	144.85	85.21	97.66	94.05	95.31	125.59	134.41	1.51	1.83	16.28	121.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.22	1.16	1.17	1.07	1.19	1.24	1.18	0.36	0.38	0.91	1.22
d, Delay for Lane Group [s/veh]	216.85	141.21	153.66	166.05	151.31	181.59	207.41	34.62	35.24	71.91	176.26
Lane Group LOS	F	F	F	F	F	F	F	C	D	E	F
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	12.02	28.30	30.84	9.94	29.54	31.73	10.15	7.16	6.77	16.70	26.01
50th-Percentile Queue Length [m/ln]	91.60	215.65	235.00	75.72	225.11	241.81	77.33	54.54	51.57	127.24	198.22
95th-Percentile Queue Length [veh/ln]	19.05	40.57	43.98	15.52	42.63	46.41	16.29	11.55	11.03	23.40	38.47
95th-Percentile Queue Length [m/ln]	145.20	309.18	335.15	118.25	324.86	353.67	124.11	87.98	84.09	178.31	293.17

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	216.85	145.32	153.66	166.05	158.88	181.59	207.41	34.82	35.24	0.00	71.91	176.26
Movement LOS	F	F	F	F	F	F	F	C	D		E	F
d_A, Approach Delay [s/veh]	152.84			161.79			76.27			110.10		
Approach LOS	F			F			E			F		
d_I, Intersection Delay [s/veh]	136.97											
Intersection LOS	F											
Intersection V/C	0.939											

Emissions

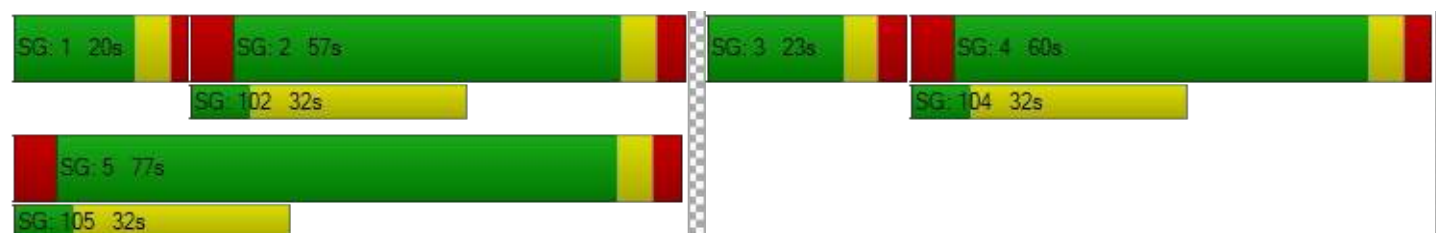
Vehicle Kilometers Traveled [km/h]	80.37	459.24	239.08	33.33	221.62	110.21	39.20	64.35	59.95	174.67	100.80
Stops [stops/h]	270.46	1273.51	693.91	223.58	1329.39	714.00	228.35	161.05	152.29	751.42	585.31
Fuel consumption [L/h]	43.78	184.12	101.68	28.39	173.33	99.57	33.13	16.39	15.43	75.51	82.18
CO [g/h]	808.35	3399.98	1877.63	524.29	3200.63	1838.59	611.80	302.62	284.94	1394.42	1517.48
NOx [g/h]	157.27	661.51	365.32	102.01	622.73	357.72	119.03	58.88	55.44	271.30	295.25
VOC [g/h]	187.34	787.98	435.16	121.51	741.78	426.11	141.79	70.14	66.04	323.17	351.69

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	7.44			1.67			6.65			9.06		
d_p, Pedestrian Delay [s]	69.38			69.38			69.38			69.38		
I_p,int, Pedestrian LOS Score for Intersectio	3.097			3.211			2.701			2.754		
Crosswalk LOS	C			C			B			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	600			600			813			563		
d_b, Bicycle Delay [s]	39.20			39.20			28.20			41.33		
I_b,int, Bicycle LOS Score for Intersection	2.520			2.521			2.092			2.583		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: Stony Plain Road and 149 Street

Control Type:	Signalized	Delay (sec / veh):	78.3
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.791

Intersection Setup												
Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [m]	90.00	30.48	30.48	65.00	30.48	75.00	50.00	30.48	0.00	110.00	30.48	75.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	60.00			60.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	53	696	442	37	1059	89	109	281	256	274	678	106
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	44	0	0	9	0	0	26	0	0	11
Total Hourly Volume [veh/h]	53	696	442	37	1059	89	109	281	256	274	678	106
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	174	111	9	265	22	27	70	64	69	170	27
Total Analysis Volume [veh/h]	53	696	442	37	1059	89	109	281	256	274	678	106
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	10			10			10			10		
v_di, Inbound Pedestrian Volume crossing m	10			10			10			10		
v_co, Outbound Pedestrian Volume crossing	10			10			10			10		
v_ci, Inbound Pedestrian Volume crossing mi	10			10			10			10		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	92.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	7	0	5	7	0	1	3	0	1	3	0
Auxiliary Signal Groups												
Maximum Green [s]	7	34	0	7	34	0	12	22	0	12	22	0
Amber [s]	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	30	0	0	19	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	5.0	0.0	2.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	9	44	0	9	44	0	14	33	0	14	33	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Calculated Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	7.00	7.00	4.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	46	37	37	46	37	37	7	26	26	7	26	26
g / C, Green / Cycle	0.46	0.37	0.37	0.46	0.37	0.37	0.07	0.26	0.26	0.07	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.08	0.21	0.28	0.06	0.32	0.06	0.07	0.15	0.16	0.09	0.36	0.07
s, saturation flow rate [veh/h]	665	3279	1589	669	3279	1547	1640	1870	1589	3186	1870	1589
c, Capacity [veh/h]	263	1213	588	329	1213	572	115	486	413	223	486	413
d1, Uniform Delay [s]	20.13	25.19	27.49	16.47	29.31	21.02	46.32	32.22	32.64	46.50	37.00	29.34
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.71	1.98	8.60	0.69	8.82	0.58	71.21	4.94	6.82	135.81	189.77	1.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.57	0.75	0.11	0.87	0.16	0.95	0.58	0.62	1.23	1.39	0.26
d, Delay for Lane Group [s/veh]	21.84	27.17	36.09	17.17	38.13	21.60	117.54	37.16	39.45	182.31	226.77	30.83
Lane Group LOS	C	C	D	B	D	C	F	D	D	F	F	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	0.77	6.64	10.15	0.51	12.66	1.44	4.95	6.50	6.16	6.95	37.21	2.17
50th-Percentile Queue Length [m/ln]	5.87	50.63	77.35	3.88	96.46	10.96	37.68	49.49	46.94	52.97	283.52	16.56
95th-Percentile Queue Length [veh/ln]	1.39	10.87	15.38	0.92	18.49	2.59	8.59	10.67	10.23	11.99	56.01	3.91
95th-Percentile Queue Length [m/ln]	10.57	82.84	117.17	6.99	140.92	19.73	65.47	81.34	77.96	91.38	426.77	29.81

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	21.84	27.17	36.09	17.17	38.13	21.60	117.54	37.16	39.45	182.31	226.77	30.83
Movement LOS	C	C	D	B	D	C	F	D	D	F	F	C
d_A, Approach Delay [s/veh]	30.24			36.23			51.63			195.62		
Approach LOS	C			D			D			F		
d_I, Intersection Delay [s/veh]	78.25											
Intersection LOS	E											
Intersection V/C	0.791											

Emissions

Vehicle Kilometers Traveled [km/h]	13.31	174.81	111.02	7.73	221.18	18.59	25.95	66.89	60.94	98.73	244.31	38.20
Stops [stops/h]	27.75	478.35	365.44	18.34	911.40	51.80	178.03	233.83	221.77	500.52	1339.48	78.24
Fuel consumption [L/h]	2.95	45.22	33.75	1.75	79.78	4.77	16.33	19.65	18.55	59.10	171.71	7.91
CO [g/h]	54.40	835.05	623.16	32.39	1473.21	88.10	301.54	362.91	342.59	1091.23	3170.66	146.00
NOx [g/h]	10.58	162.47	121.24	6.30	286.63	17.14	58.67	70.61	66.66	212.31	616.89	28.41
VOC [g/h]	12.61	193.53	144.42	7.51	341.43	20.42	69.88	84.11	79.40	252.90	734.83	33.84

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			93.10			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	47.94			62.27			66.36			36.89		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersectio	2.970			2.898			2.523			2.661		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	740			740			520			520		
d_b, Bicycle Delay [s]	19.85			19.85			27.38			27.38		
I_b,int, Bicycle LOS Score for Intersection	2.578			2.545			2.668			3.323		
Bicycle LOS	B			B			B			C		

Sequence

Ring 1	1	3	5	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: 95 Avenue and 156 Street

Control Type:	Signalized	Delay (sec / veh):	58.3
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.708

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [m]	75.00	30.48	30.48	75.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	114	292	113	71	469	70	78	449	66	85	482	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	11	0	0	7	0	0	7	0	0	1
Total Hourly Volume [veh/h]	114	292	113	71	469	70	78	449	66	85	482	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	73	28	18	117	18	20	112	17	21	121	3
Total Analysis Volume [veh/h]	114	292	113	71	469	70	78	449	66	85	482	11
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	20			20			20			20		
v_di, Inbound Pedestrian Volume crossing m	20			20			20			20		
v_co, Outbound Pedestrian Volume crossing	20			20			20			20		
v_ci, Inbound Pedestrian Volume crossing mi	20			20			20			20		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	1	3	0	1	3	0	5	7	0	5	7	0
Auxiliary Signal Groups												
Maximum Green [s]	14	28	0	14	28	0	10	40	0	10	40	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	0	29	0	0	30	0	0	30	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	3.0	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	14	48	0	14	48	0	8	50	0	8	50	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	0.00	3.00
g_i, Effective Green Time [s]	9	38	9	38	53	40	53	40
g / C, Green / Cycle	0.08	0.32	0.08	0.32	0.44	0.33	0.44	0.33
(v / s)_i Volume / Saturation Flow Rate	0.07	0.23	0.04	0.30	0.07	0.31	0.08	0.29
s, saturation flow rate [veh/h]	1640	1761	1640	1817	1057	1669	1042	1713
c, Capacity [veh/h]	123	558	123	576	310	556	284	571
d1, Uniform Delay [s]	55.17	36.39	53.66	39.83	24.41	38.57	25.61	37.44
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	63.33	8.05	18.22	24.74	1.93	23.66	2.68	15.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.93	0.73	0.58	0.94	0.25	0.93	0.30	0.86
d, Delay for Lane Group [s/veh]	118.50	44.44	71.88	64.57	26.34	62.24	28.29	53.30
Lane Group LOS	F	D	E	E	C	E	C	D
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	5.58	11.69	2.69	19.16	1.45	18.03	1.62	15.87
50th-Percentile Queue Length [m/ln]	42.54	89.04	20.52	146.01	11.05	137.35	12.32	120.91
95th-Percentile Queue Length [veh/ln]	9.46	17.29	4.85	26.34	2.61	24.99	2.91	22.40
95th-Percentile Queue Length [m/ln]	72.06	131.76	36.94	200.71	19.90	190.41	22.18	170.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	118.50	44.44	44.44	71.88	64.57	64.57	26.34	62.24	62.24	28.29	53.30	53.30
Movement LOS	F	D	D	E	E	E	C	E	E	C	D	D
d_A, Approach Delay [s/veh]	60.70			65.42			57.51			49.62		
Approach LOS	E			E			E			D		
d_I, Intersection Delay [s/veh]	58.35											
Intersection LOS	E											
Intersection V/C	0.708											

Emissions

Vehicle Kilometers Traveled [km/h]	28.81	102.35	24.07	182.75	22.31	147.33	29.23	169.52
Stops [stops/h]	167.47	350.55	80.80	574.84	43.52	540.76	48.52	476.04
Fuel consumption [L/h]	16.90	31.46	8.03	57.09	4.68	50.84	5.72	47.05
CO [g/h]	312.12	580.99	148.35	1054.17	86.45	938.70	105.65	868.77
NOx [g/h]	60.73	113.04	28.86	205.10	16.82	182.64	20.56	169.03
VOC [g/h]	72.34	134.65	34.38	244.31	20.04	217.55	24.48	201.35

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	25.49	28.68	23.46	20.20
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.401	2.339	2.476	2.455
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	633	633	667	667
d_b, Bicycle Delay [s]	28.02	28.02	26.67	26.67
I_b,int, Bicycle LOS Score for Intersection	2.434	2.578	2.550	2.515
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	3	5	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: 109 Street and 87 Ave

Control Type:	Signalized	Delay (sec / veh):	230.6
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.083

Intersection Setup

Name	109 Street				109 Street				87 Ave			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration												
Turning Movement	Left	Thru	Thru	Right	Left	Left	Thru	Right	Left	Left	Thru	Right
Lane Width [m]	3.20	3.66	3.20	4.00	3.66	3.66	3.60	4.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Entry Pocket Length [m]	80.00	30.48	30.48	35.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	45.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00				50.00				50.00			
Grade [%]	0.00				0.00				0.00			
Curb Present	Yes				Yes				Yes			
Crosswalk	Yes				Yes				Yes			

Volumes

Name	109 Street				109 Street				87 Ave			
Base Volume Input [veh/h]	350	806	0	9	0	0	1835	175	532	0	72	243
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	1	0	0	0	18	0	0	0	24
Total Hourly Volume [veh/h]	350	806	0	8	0	0	1835	157	532	0	72	219
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	202	0	2	0	0	459	39	133	0	18	55
Total Analysis Volume [veh/h]	350	806	0	8	0	0	1835	157	532	0	72	219
Presence of On-Street Parking	No			No	No			No	No			No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	106				0				51			
v_di, Inbound Pedestrian Volume crossing th	105				0				51			
v_co, Outbound Pedestrian Volume along th	41				51				105			
v_ci, Inbound Pedestrian Volume along the l	40				51				106			
v_ab, Corner Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycles/h]	19				25				9			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	110
Active Pattern	Pattern 2
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	3.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Overlap	Overlap	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	1	0	3	0	0	1	0	0	0	3	2
Auxiliary Signal Groups	1,2	1,2		1,3								
Maximum Green [s]	30	59	0	26	0	0	59	0	0	0	26	30
Amber [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
All red [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
Walk [s]	0	8	0	7	0	0	8	0	0	0	7	0
Pedestrian Clearance [s]	0	16	0	19	0	0	16	0	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk												
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 2

Split [s]	12	43	0	25	0	0	43	0	0	0	25	12
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	24	0	20	0	0	24	0	0	0	20	5
Vehicle Extension [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Minimum Recall	No	Yes		No			Yes				No	
Maximum Recall	Yes	No		No			No				No	
Pedestrian Recall	No	No		Yes			No				Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	C	R	C	C	L	C	R
C, Calculated Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	50	50	75	38	38	20	20	20
g / C, Green / Cycle	0.46	0.46	0.68	0.35	0.35	0.18	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.78	0.25	0.01	0.59	0.59	0.25	0.31	0.16
s, saturation flow rate [veh/h]	448	3204	1456	1683	1688	1086	1053	1398
c, Capacity [veh/h]	240	1458	992	582	584	243	250	254
d1, Uniform Delay [s]	45.39	21.83	5.58	35.98	35.98	48.42	48.10	43.47
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.47	0.50	0.18
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	227.03	1.51	0.01	327.20	324.92	94.27	169.46	13.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.46	0.55	0.01	1.71	1.71	1.13	1.32	0.86
d, Delay for Lane Group [s/veh]	272.41	23.34	5.60	363.18	360.90	142.70	217.56	56.73
Lane Group LOS	F	C	A	F	F	F	F	E
Critical Lane Group	Yes	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	19.03	7.69	0.06	68.09	67.92	13.09	18.66	6.64
50th-Percentile Queue Length [m/ln]	145.03	58.62	0.45	518.81	517.54	99.74	142.19	50.61
95th-Percentile Queue Length [veh/ln]	32.12	12.24	0.11	106.21	105.88	20.15	29.14	10.87
95th-Percentile Queue Length [m/ln]	244.79	93.28	0.80	809.29	806.83	153.56	222.07	82.82

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	272.41	23.34	0.00	5.60	0.00	0.00	362.13	360.90	178.50	0.00	217.56	56.73
Movement LOS	F	C		A			F	F	F		F	E
d_A, Approach Delay [s/veh]	98.11				362.04				149.83			
Approach LOS	F				F				F			
d_I, Intersection Delay [s/veh]	230.56											
Intersection LOS	F											
Intersection V/C	1.083											

Emissions

Vehicle Kilometers Traveled [km/h]	36.98	85.15	0.85	103.13	103.13	54.10	65.10	43.22
Stops [stops/h]	622.89	503.55	1.92	2228.24	2222.79	428.36	610.70	217.37
Fuel consumption [L/h]	90.92	33.89	0.16	338.38	336.51	44.88	75.17	18.56
CO [g/h]	1678.92	625.80	2.92	6248.36	6213.87	828.81	1387.99	342.68
NOx [g/h]	326.66	121.76	0.57	1215.70	1208.99	161.26	270.05	66.67
VOC [g/h]	389.11	145.03	0.68	1448.12	1440.12	192.09	321.68	79.42

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0				11.0				11.0			
M_corner, Corner Circulation Area [m²/ped]	8.37				54.68				0.00			
M_CW, Crosswalk Circulation Area [m²/ped]	3.92				0.00				5.82			
d_p, Pedestrian Delay [s]	44.55				44.55				44.55			
I_p,int, Pedestrian LOS Score for Intersectio	3.103				2.765				2.614			
Crosswalk LOS	C				C				B			
s_b, Saturation Flow Rate of the bicycle lane	2000				2000				2000			
c_b, Capacity of the bicycle lane [bicycles/h]	909				691				364			
d_b, Bicycle Delay [s]	16.52				23.86				36.98			
I_b,int, Bicycle LOS Score for Intersection	2.521				3.218				2.957			
Bicycle LOS	B				C				C			

Intersection Setup

Name	87 Ave							
Approach	Westbound				Southwestbound			
Lane Configuration								
Turning Movement	Left	Thru	Right	Right	Left	Thru	Right	Right
Lane Width [m]	3.50	3.66	3.50	3.66	3.66	3.66	3.66	3.66
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0
Entry Pocket Length [m]	30.48	30.48	30.48	10.00	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	30.00				50.00			
Grade [%]	0.00				0.00			
Curb Present	Yes							
Crosswalk	Yes				Yes			

Volumes

Name	87 Ave							
Base Volume Input [veh/h]	59	0	0	197	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00							
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	20	0	0	0	0
Total Hourly Volume [veh/h]	59	0	0	177	0	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	0	0	44	0	0	0	0
Total Analysis Volume [veh/h]	59	0	0	177	0	0	0	0
Presence of On-Street Parking	No			No				
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	40				0			
v_di, Inbound Pedestrian Volume crossing th	41				0			
v_co, Outbound Pedestrian Volume along th	0				0			
v_ci, Inbound Pedestrian Volume along the l	0				0			
v_ab, Corner Pedestrian Volume [ped/h]	0				0			
Bicycle Volume [bicycles/h]	0				0			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	110
Active Pattern	Pattern 2
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	3.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	3	0	0	0	0	0	0	0
Auxiliary Signal Groups								
Maximum Green [s]	26	0	0	0	0	0	0	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All red [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk [s]	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	19	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk								
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 2

Split [s]	25	0	0	0	0	0	0	0
Lead / Lag	Lag	-	-	-	-	-	-	-
Minimum Green [s]	20	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No							
Maximum Recall	No							
Pedestrian Recall	Yes							

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	R	
C, Calculated Cycle Length [s]	110	110	
L, Total Lost Time per Cycle [s]	5.00	5.00	
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	
l2, Clearance Lost Time [s]	3.00	3.00	
g_i, Effective Green Time [s]	20	20	
g / C, Green / Cycle	0.18	0.18	
(v / s)_i Volume / Saturation Flow Rate	0.06	0.12	
s, saturation flow rate [veh/h]	979	1431	
c, Capacity [veh/h]	65	260	
d1, Uniform Delay [s]	55.00	42.02	
k, delay calibration	0.11	0.11	
l, Upstream Filtering Factor	1.00	1.00	
d2, Incremental Delay [s]	31.69	3.12	
d3, Initial Queue Delay [s]	0.00	0.00	
Rp, platoon ratio	1.00	1.00	
PF, progression factor	1.00	1.00	

Lane Group Results

X, volume / capacity	0.90	0.68	
d, Delay for Lane Group [s/veh]	86.69	45.13	
Lane Group LOS	F	D	
Critical Lane Group	No	No	
50th-Percentile Queue Length [veh/ln]	2.24	4.80	
50th-Percentile Queue Length [m/ln]	17.06	36.55	
95th-Percentile Queue Length [veh/ln]	4.03	8.39	
95th-Percentile Queue Length [m/ln]	30.71	63.91	

Movement, Approach, & Intersection Results								
d_M, Delay for Movement [s/veh]	86.69	0.00	0.00	45.13	0.00	0.00	0.00	0.00
Movement LOS	F			D				
d_A, Approach Delay [s/veh]	55.52				0.00			
Approach LOS	E				A			
d_I, Intersection Delay [s/veh]	230.56							
Intersection LOS	F							
Intersection V/C	1.083							

Emissions			
Vehicle Kilometers Traveled [km/h]	2.14	6.43	
Stops [stops/h]	73.27	156.96	
Fuel consumption [L/h]	4.79	8.19	
CO [g/h]	88.40	151.23	
NOx [g/h]	17.20	29.42	
VOC [g/h]	20.49	35.05	

Other Modes		
g_Walk,mi, Effective Walk Time [s]	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	14.11	0.00
d_p, Pedestrian Delay [s]	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersectio	2.046	3.296
Crosswalk LOS	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	364	0
d_b, Bicycle Delay [s]	36.82	55.00
I_b,int, Bicycle LOS Score for Intersection	1.560	4.132
Bicycle LOS	A	D

Sequence																
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 29: 114 Street and 82 Ave

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 94.9
Level Of Service: F
Volume to Capacity (v/c): 0.748

Intersection Setup

Name	114 Street			114 Street			University Ave			82 Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵			↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.70	3.60	3.66	3.60	3.60	4.00	3.60	3.60	3.66	3.66	3.66
No. of Lanes in Entry Pocket	2	0	1	0	0	1	1	0	1	2	0	0
Entry Pocket Length [m]	170.00	30.48	2.00	30.48	30.48	105.00	95.00	30.48	95.00	100.00	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	114 Street			114 Street			University Ave			82 Ave		
Base Volume Input [veh/h]	624	314	251	0	966	33	19	277	739	289	278	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	25	0	0	3	0	0	0	0	0	2
Total Hourly Volume [veh/h]	624	314	226	0	966	33	19	277	739	289	278	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	156	79	57	0	242	8	5	69	185	72	70	4
Total Analysis Volume [veh/h]	624	314	226	0	966	33	19	277	739	289	278	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	4			2			3			2		
v_di, Inbound Pedestrian Volume crossing m	3			2			4			2		
v_co, Outbound Pedestrian Volume crossing	13			0			0			13		
v_ci, Inbound Pedestrian Volume crossing mi	13			0			0			13		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	142
Active Pattern	Pattern 2
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Overlap	Permiss	Permiss	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	2	1	0	0	1	2	3	6	2	5	4	0
Auxiliary Signal Groups		1,2				1,2			2,6			
Maximum Green [s]	38	33	0	0	33	38	10	38	38	16	38	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	3.0	3.0	0.0	0.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	0	9	0	0	9	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	22	0	0	22	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	0.0	0.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	0.0
Detector Location [m]	1.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0
Detector Length [m]	5.0	5.0	0.0	0.0	5.0	5.0	5.0	0.0	0.0	5.0	5.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 2

Split [s]	35	55	0	0	55	35	17	36	35	17	36	0
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	10	27	0	0	27	10	7	29	10	7	29	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Minimum Recall	No	Yes			Yes	No	No	No	No	No	No	
Maximum Recall	No	No			No	No	No	Yes	No	No	Yes	
Pedestrian Recall	No	No			No	No	No	No	No	No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	R	L	C	C
C, Calculated Cycle Length [s]	151	151	151	151	151	151	151	151	151	151	151
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	4.00	4.00	0.00	5.00	5.00	0.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	38	77	33	33	77	4	38	82	16	50	50
g / C, Green / Cycle	0.25	0.51	0.22	0.22	0.51	0.03	0.25	0.54	0.10	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.26	0.10	0.16	0.30	0.03	0.01	0.09	0.32	0.09	0.10	0.10
s, saturation flow rate [veh/h]	2404	3204	1431	3204	1318	1535	2951	2325	3113	1550	1520
c, Capacity [veh/h]	619	1636	313	701	673	40	744	1264	326	513	503
d1, Uniform Delay [s]	58.85	20.02	54.62	58.88	18.52	72.45	46.54	22.98	66.60	37.30	37.31
k, delay calibration	0.11	0.11	0.22	0.20	0.11	0.11	0.50	0.16	0.11	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.78	0.06	6.27	173.39	0.03	8.77	1.43	0.65	8.03	1.42	1.45
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.01	0.19	0.72	1.38	0.05	0.48	0.37	0.58	0.89	0.29	0.29
d, Delay for Lane Group [s/veh]	77.64	20.08	60.89	232.27	18.55	81.21	47.97	23.63	74.63	38.72	38.76
Lane Group LOS	F	C	E	F	B	F	D	C	E	D	D
Critical Lane Group	Yes	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	13.67	3.07	8.54	30.27	0.60	0.83	4.49	8.87	5.87	4.31	4.25
50th-Percentile Queue Length [m/ln]	104.18	23.40	65.08	230.62	4.57	6.29	34.20	67.57	44.72	32.85	32.37
95th-Percentile Queue Length [veh/ln]	19.83	5.53	13.33	45.85	1.08	1.49	7.96	13.75	9.84	7.72	7.63
95th-Percentile Queue Length [m/ln]	151.10	42.13	101.60	349.37	8.23	11.32	60.68	104.79	75.00	58.80	58.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.64	20.08	60.89	0.00	232.27	18.55	81.21	47.97	23.63	74.63	38.74	38.76
Movement LOS	F	C	E		F	B	F	D	C	E	D	D
d_A, Approach Delay [s/veh]	58.86			225.21			31.20			56.53		
Approach LOS	E			F			C			E		
d_I, Intersection Delay [s/veh]	94.88											
Intersection LOS	F											
Intersection V/C	0.748											

Emissions

Vehicle Kilometers Traveled [km/h]	176.63	88.88	63.97	223.29	7.63	6.25	91.08	242.98	47.95	24.58	24.19
Stops [stops/h]	652.80	146.64	203.89	1445.04	14.33	19.70	214.30	423.39	280.23	102.93	101.42
Fuel consumption [L/h]	68.76	16.60	21.26	226.46	1.52	2.22	23.71	46.07	27.46	9.07	8.93
CO [g/h]	1269.74	306.58	392.58	4181.79	28.05	41.08	437.76	850.66	507.05	167.43	164.91
NOx [g/h]	247.05	59.65	76.38	813.62	5.46	7.99	85.17	165.51	98.65	32.57	32.08
VOC [g/h]	294.27	71.05	90.98	969.17	6.50	9.52	101.46	197.15	117.51	38.80	38.22

Other Modes

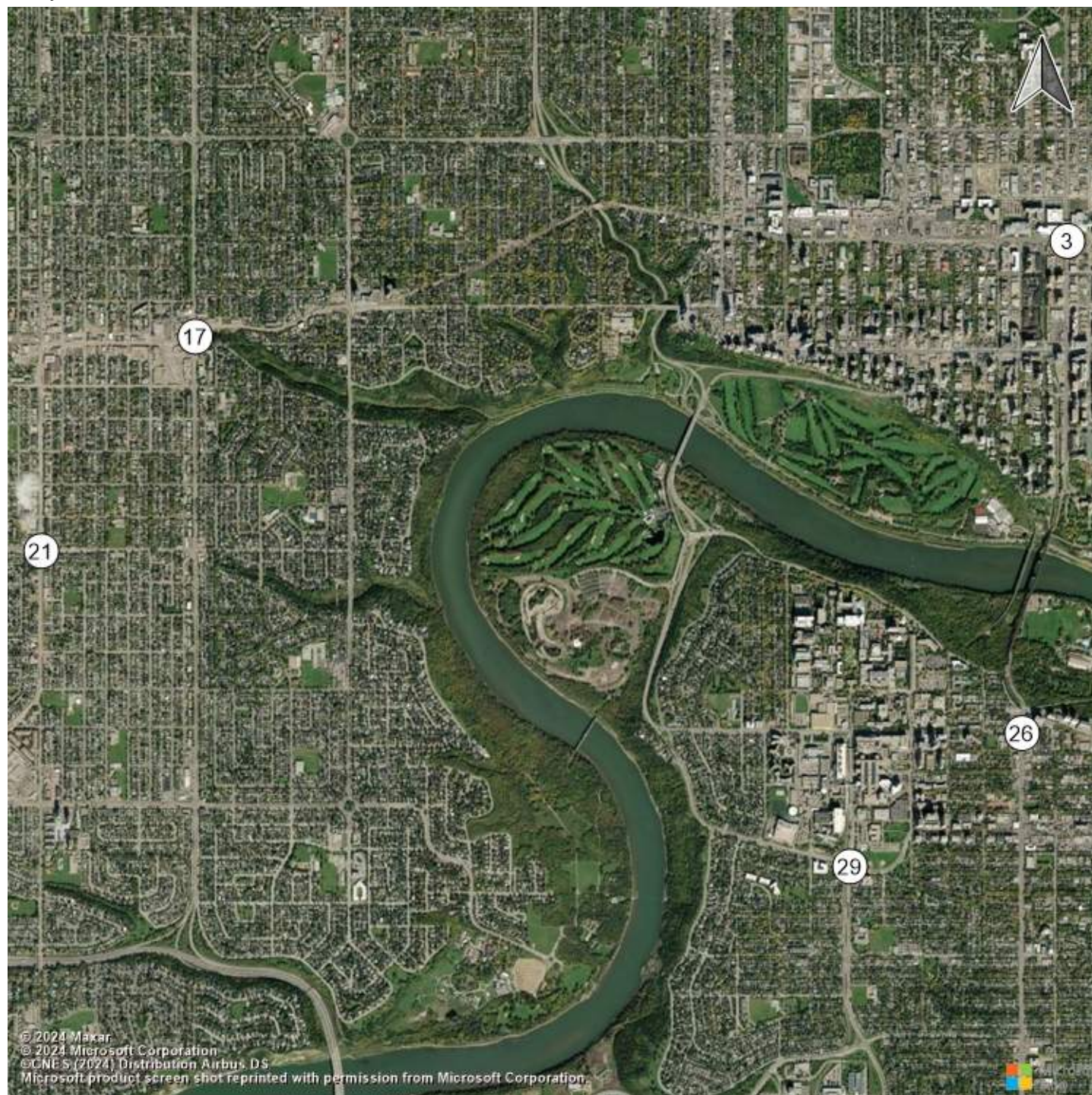
g_Walk,mi, Effective Walk Time [s]	11.0			11.0			13.0			13.0		
M_corner, Corner Circulation Area [m²/ped]	25.12			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	0.00			246.03			0.00			27.69		
d_p, Pedestrian Delay [s]	64.80			64.80			62.96			62.96		
I_p,int, Pedestrian LOS Score for Intersectio	3.001			2.602			3.790			2.666		
Crosswalk LOS	C			B			D			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1114			650			385			385		
d_b, Bicycle Delay [s]	14.80			34.36			49.19			49.19		
I_b,int, Bicycle LOS Score for Intersection	2.541			2.386			2.413			2.042		
Bicycle LOS	B			B			B			B		

Sequence

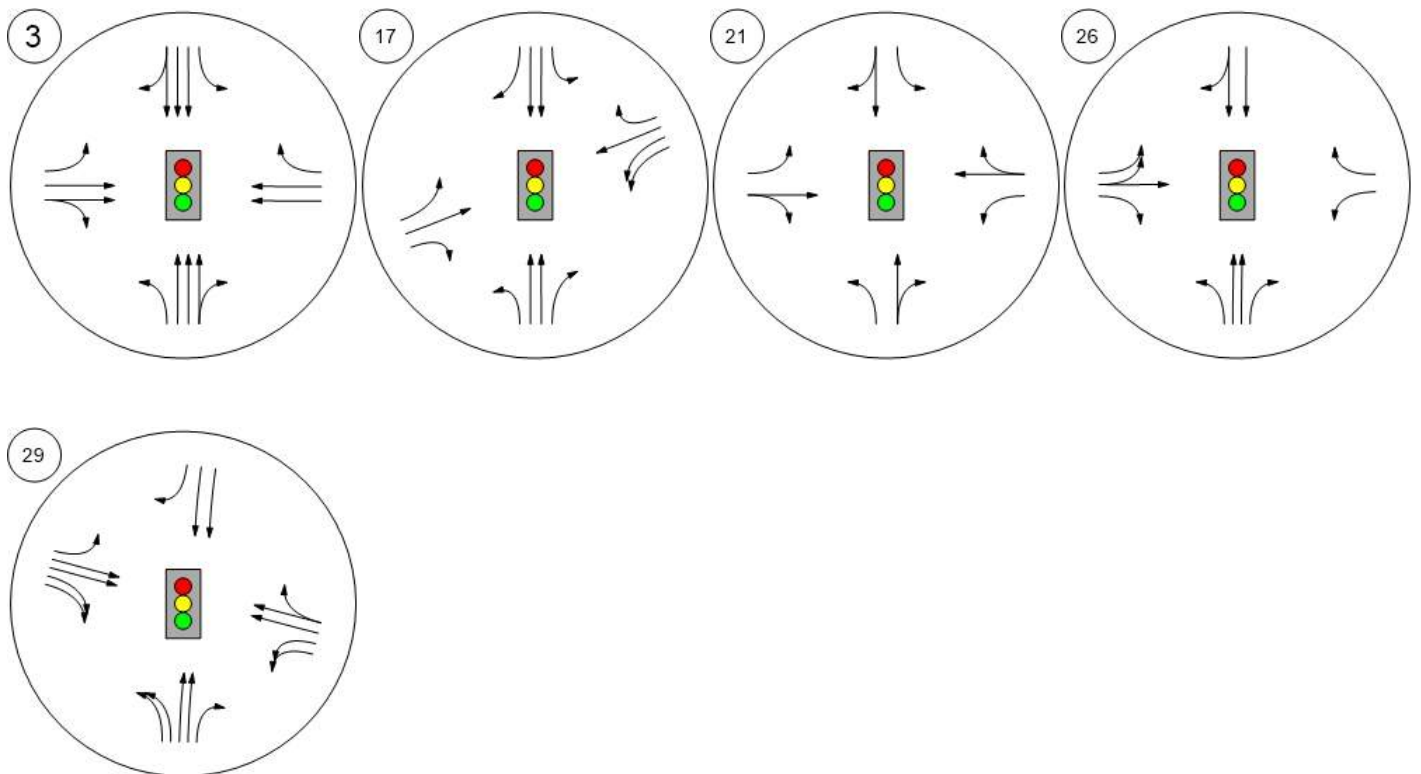
Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	6	5	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



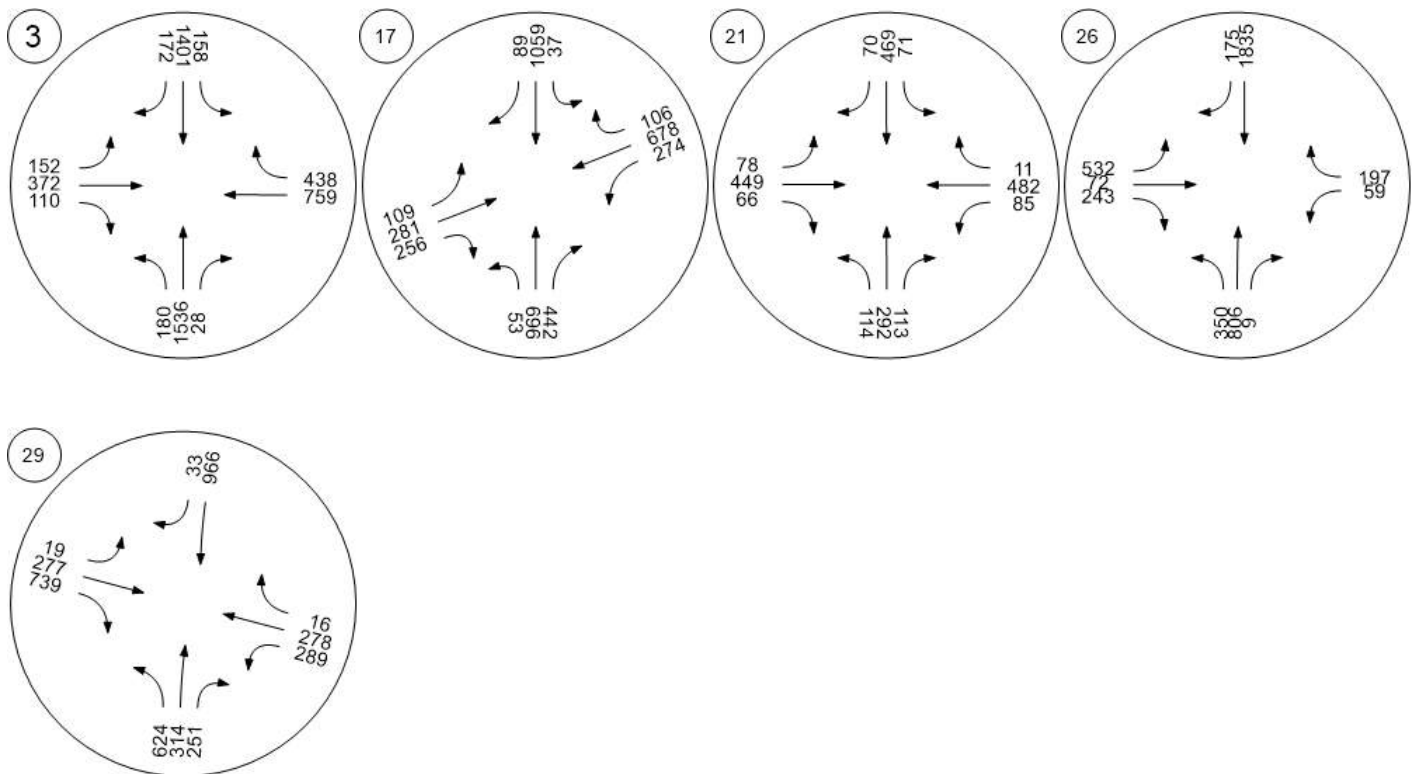
Study Intersections



Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Traffic Conditions

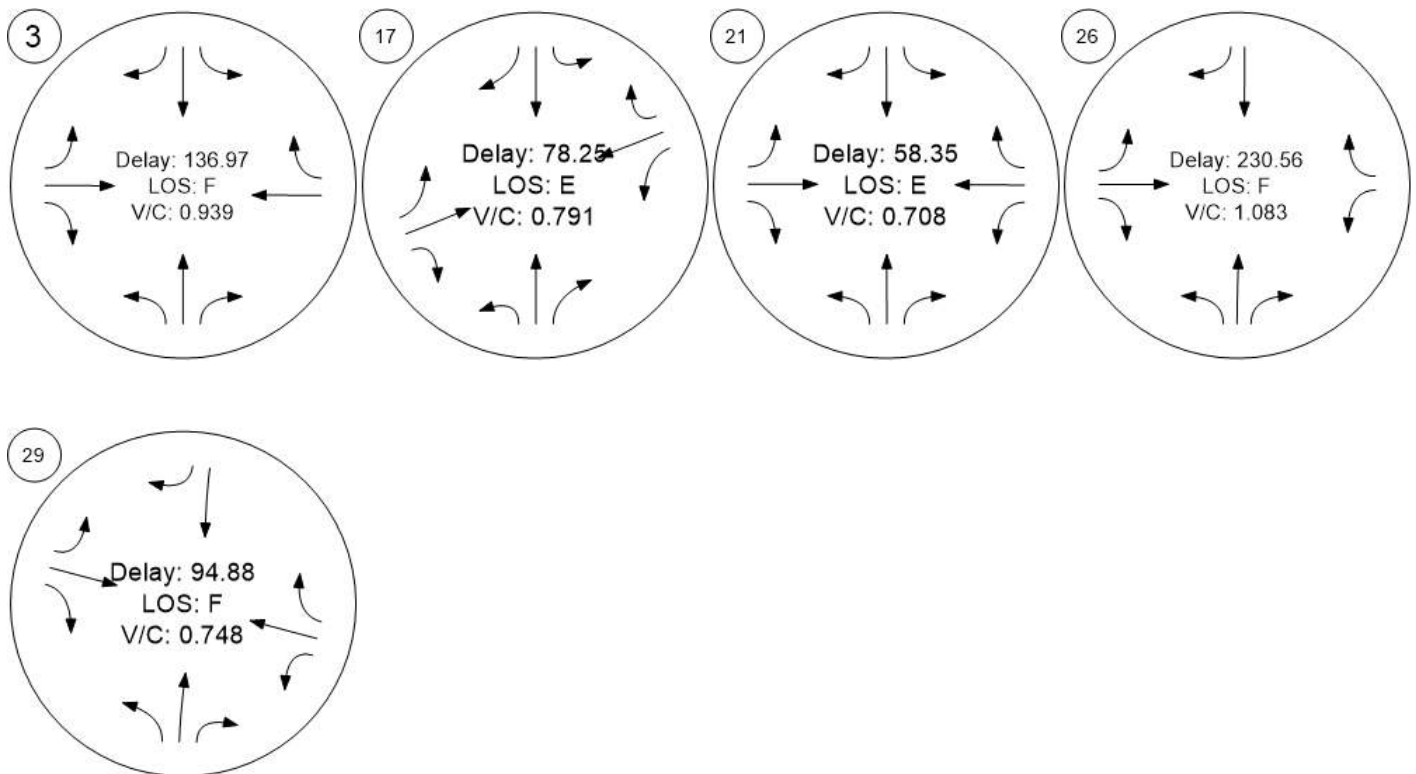


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Priority Growth Areas Mobility Study

Vistro File: Z:\...\Z0016285 PGA Sensitivity Analysis.vistro
Report File: Z:\...\PM Sensitivity Analysis +20% Volume.pdf

Scenario 9 +20% PM
2025-04-24

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	104 Avenue and 109 Street	Signalized	HCM 7th Edition	EB Left	0.996	160.9	F
17	Stony Plain Road and 149 Street	Signalized	HCM 7th Edition	WB Left	0.824	92.2	F
21	95 Avenue and 156 Street	Signalized	HCM 7th Edition	NB Left	0.761	69.8	E
26	109 Street and 87 Ave	Signalized	HCM 7th Edition	SB Thru	1.083	230.6	F
29	114 Street and 82 Ave	Signalized	HCM 7th Edition	SB Thru	0.784	111.3	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: 104 Avenue and 109 Street

Control Type:	Signalized	Delay (sec / veh):	160.9
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.996

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.66	3.60	3.60
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	0	0	1
Entry Pocket Length [m]	100.00	30.48	30.48	100.00	30.48	30.48	70.00	30.48	30.48	30.48	30.48	55.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	197	1675	28	173	1529	187	166	372	110	0	828	438
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	19	0	0	11	0	0	44
Total Hourly Volume [veh/h]	197	1675	28	173	1529	187	166	372	110	0	828	438
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	419	7	43	382	47	42	93	28	0	207	110
Total Analysis Volume [veh/h]	197	1675	28	173	1529	187	166	372	110	0	828	438
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	50			50			50			50		
v_di, Inbound Pedestrian Volume crossing m	50			50			50			50		
v_co, Outbound Pedestrian Volume crossing	50			50			50			50		
v_ci, Inbound Pedestrian Volume crossing mi	50			50			50			50		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	160
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	4	0	3	4	0	1	5	0	0	2	0
Auxiliary Signal Groups												
Maximum Green [s]	17	43	0	17	43	0	13	69	0	0	50	0
Amber [s]	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	3.0	3.0	0.0	3.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	5.0	5.0	0.0	5.0	5.0	0.0	4.0	5.0	0.0	0.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	24	62	0	24	62	0	20	74	0	0	54	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	0	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No			No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes			Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes			Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	C	R
C, Calculated Cycle Length [s]	160	160	160	160	160	160	160	160	160	160	160
L, Total Lost Time per Cycle [s]	7.00	7.00	7.00	7.00	7.00	7.00	6.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	17	50	50	17	50	50	14	62	62	42	42
g / C, Green / Cycle	0.11	0.31	0.31	0.11	0.31	0.31	0.09	0.39	0.39	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.13	0.38	0.38	0.12	0.39	0.40	0.11	0.15	0.16	0.28	0.35
s, saturation flow rate [veh/h]	1476	2951	1528	1476	2951	1411	1476	1683	1489	2951	1267
c, Capacity [veh/h]	157	922	478	157	922	441	129	652	577	775	333
d1, Uniform Delay [s]	71.50	55.00	55.00	71.50	55.00	55.00	73.00	35.24	35.56	59.00	56.69
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	156.58	106.24	117.52	102.10	117.83	148.91	174.47	1.70	2.09	52.30	162.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.26	1.21	1.22	1.10	1.24	1.30	1.29	0.38	0.40	1.07	1.32
d, Delay for Lane Group [s/veh]	228.08	161.24	172.52	173.60	172.83	203.91	247.47	36.94	37.65	111.30	219.05
Lane Group LOS	F	F	F	F	F	F	F	D	D	F	F
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	13.28	32.14	34.77	10.91	33.62	35.95	11.59	7.43	7.02	21.30	27.93
50th-Percentile Queue Length [m/ln]	101.19	244.90	264.97	83.10	256.20	273.96	88.29	56.60	53.51	162.33	212.85
95th-Percentile Queue Length [veh/ln]	20.97	46.58	50.18	16.98	49.06	53.17	18.69	11.90	11.37	30.06	42.30
95th-Percentile Queue Length [m/ln]	159.80	354.96	382.38	129.35	373.81	405.15	142.43	90.65	86.63	229.07	322.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	228.08	164.98	172.52	173.60	180.64	203.91	247.47	37.17	37.65	0.00	111.30	219.05
Movement LOS	F	F	F	F	F	F	F	D	D		F	F
d_A, Approach Delay [s/veh]	171.64			182.30			91.13			148.58		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	160.90											
Intersection LOS	F											
Intersection V/C	0.996											

Emissions

Vehicle Kilometers Traveled [km/h]	87.96	499.86	260.52	36.50	241.51	120.49	42.81	64.37	59.92	190.54	100.80
Stops [stops/h]	298.78	1446.24	782.39	245.37	1513.01	808.94	260.69	167.12	158.01	958.66	628.51
Fuel consumption [L/h]	49.68	219.03	119.87	32.11	209.30	119.31	41.56	16.98	15.98	110.61	97.58
CO [g/h]	917.31	4044.50	2213.38	592.86	3864.94	2203.08	767.40	313.47	295.17	2042.48	1801.90
NOx [g/h]	178.47	786.91	430.64	115.35	751.98	428.64	149.31	60.99	57.43	397.39	350.59
VOC [g/h]	212.59	937.35	512.97	137.40	895.74	510.58	177.85	72.65	68.41	473.36	417.61

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	7.44			1.67			6.40			9.06		
d_p, Pedestrian Delay [s]	69.38			69.38			69.38			69.38		
I_p,int, Pedestrian LOS Score for Intersectio	3.138			3.259			2.724			2.771		
Crosswalk LOS	C			C			B			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	625			625			775			525		
d_b, Bicycle Delay [s]	37.81			37.81			30.01			43.51		
I_b,int, Bicycle LOS Score for Intersection	2.606			2.609			2.103			2.640		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: Stony Plain Road and 149 Street

Control Type:	Signalized	Delay (sec / veh):	92.2
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.824

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
No. of Lanes in Entry Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [m]	90.00	30.48	30.48	65.00	30.48	75.00	50.00	30.48	0.00	110.00	30.48	75.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	60.00			60.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	53	696	482	41	1059	89	109	281	280	274	739	115
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	48	0	0	9	0	0	28	0	0	12
Total Hourly Volume [veh/h]	53	696	482	41	1059	89	109	281	280	274	739	115
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	174	121	10	265	22	27	70	70	69	185	29
Total Analysis Volume [veh/h]	53	696	482	41	1059	89	109	281	280	274	739	115
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	10			10			10			10		
v_di, Inbound Pedestrian Volume crossing m	10			10			10			10		
v_co, Outbound Pedestrian Volume crossing	10			10			10			10		
v_ci, Inbound Pedestrian Volume crossing mi	10			10			10			10		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	92.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	7	0	5	7	0	1	3	0	1	3	0
Auxiliary Signal Groups												
Maximum Green [s]	7	34	0	7	34	0	12	22	0	12	22	0
Amber [s]	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	30	0	0	19	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	5.0	0.0	2.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	9	44	0	9	44	0	13	34	0	13	34	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Calculated Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	7.00	7.00	4.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	46	37	37	46	37	37	6	27	27	6	27	27
g / C, Green / Cycle	0.46	0.37	0.37	0.46	0.37	0.37	0.06	0.27	0.27	0.06	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.08	0.21	0.30	0.06	0.32	0.06	0.07	0.15	0.18	0.09	0.40	0.07
s, saturation flow rate [veh/h]	665	3279	1589	653	3279	1547	1640	1870	1589	3186	1870	1589
c, Capacity [veh/h]	263	1213	588	324	1213	572	98	505	429	191	505	429
d1, Uniform Delay [s]	20.13	25.19	28.48	16.53	29.31	21.02	47.00	31.36	32.34	47.00	36.50	28.72
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.71	1.98	12.10	0.80	8.82	0.58	122.67	4.38	7.51	222.42	219.36	1.53
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.57	0.82	0.13	0.87	0.16	1.11	0.56	0.65	1.43	1.46	0.27
d, Delay for Lane Group [s/veh]	21.84	27.17	40.58	17.33	38.13	21.60	169.67	35.74	39.85	269.42	255.86	30.25
Lane Group LOS	C	C	D	B	D	C	F	D	D	F	F	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	0.77	6.64	11.86	0.57	12.66	1.44	5.78	6.35	6.79	8.26	42.76	2.33
50th-Percentile Queue Length [m/ln]	5.87	50.63	90.37	4.33	96.46	10.96	44.05	48.39	51.75	62.95	325.84	17.77
95th-Percentile Queue Length [veh/ln]	1.39	10.87	17.51	1.02	18.49	2.59	10.02	10.48	11.06	14.25	64.82	4.20
95th-Percentile Queue Length [m/ln]	10.57	82.84	133.40	7.79	140.92	19.73	76.37	79.88	84.31	108.61	493.93	31.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	21.84	27.17	40.58	17.33	38.13	21.60	169.67	35.74	39.85	269.42	255.86	30.25
Movement LOS	C	C	D	B	D	C	F	D	D	F	F	C
d_A, Approach Delay [s/veh]	32.19			36.17			59.25			236.15		
Approach LOS	C			D			E			F		
d_I, Intersection Delay [s/veh]	92.16											
Intersection LOS	F											
Intersection V/C	0.824											

Emissions

Vehicle Kilometers Traveled [km/h]	13.31	174.81	121.06	8.56	221.18	18.59	25.95	66.89	66.65	98.73	266.29	41.44
Stops [stops/h]	27.75	478.35	426.93	20.44	911.40	51.80	208.10	228.60	244.47	594.78	1539.40	83.97
Fuel consumption [L/h]	2.95	45.22	39.39	1.95	79.78	4.77	21.38	19.23	20.42	79.59	205.49	8.51
CO [g/h]	54.40	835.05	727.32	36.05	1473.21	88.10	394.82	355.04	377.09	1469.69	3794.51	157.07
NOx [g/h]	10.58	162.47	141.51	7.01	286.63	17.14	76.82	69.08	73.37	285.95	738.27	30.56
VOC [g/h]	12.61	193.53	168.56	8.36	341.43	20.42	91.50	82.28	87.39	340.62	879.42	36.40

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [m²/ped]	0.00			93.10			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	45.41			61.26			66.36			33.25		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersectio	2.982			2.901			2.533			2.672		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	740			740			540			540		
d_b, Bicycle Delay [s]	19.85			19.85			26.65			26.65		
I_b,int, Bicycle LOS Score for Intersection	2.615			2.548			2.711			3.441		
Bicycle LOS	B			B			B			C		

Sequence

Ring 1	1	3	5	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: 95 Avenue and 156 Street

Control Type:	Signalized	Delay (sec / veh):	69.8
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.761

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [m]	75.00	30.48	30.48	75.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	125	318	113	71	511	70	78	490	66	85	526	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	11	0	0	7	0	0	7	0	0	1
Total Hourly Volume [veh/h]	125	318	113	71	511	70	78	490	66	85	526	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	80	28	18	128	18	20	123	17	21	132	3
Total Analysis Volume [veh/h]	125	318	113	71	511	70	78	490	66	85	526	11
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	20			20			20			20		
v_di, Inbound Pedestrian Volume crossing m	20			20			20			20		
v_co, Outbound Pedestrian Volume crossing	20			20			20			20		
v_ci, Inbound Pedestrian Volume crossing mi	20			20			20			20		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	1	3	0	1	3	0	5	7	0	5	7	0
Auxiliary Signal Groups												
Maximum Green [s]	14	28	0	14	28	0	10	40	0	10	40	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	29	0	0	29	0	0	30	0	0	30	0
Delayed Vehicle Green [s]	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	3.0	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	14	48	0	14	48	0	8	50	0	8	50	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pedestrian Recall	No	Yes		No	Yes		No	Yes		No	Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	0.00	3.00
g_i, Effective Green Time [s]	9	38	9	38	53	40	53	40
g / C, Green / Cycle	0.08	0.32	0.08	0.32	0.44	0.33	0.44	0.33
(v / s)_i Volume / Saturation Flow Rate	0.08	0.24	0.04	0.32	0.08	0.33	0.08	0.31
s, saturation flow rate [veh/h]	1640	1767	1640	1821	1028	1672	1016	1714
c, Capacity [veh/h]	123	559	123	577	277	557	253	571
d1, Uniform Delay [s]	55.50	37.06	53.66	41.00	25.74	39.95	26.88	38.84
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	85.48	9.85	18.22	39.34	2.52	37.48	3.56	25.45
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.02	0.77	0.58	1.01	0.28	1.00	0.34	0.94
d, Delay for Lane Group [s/veh]	140.98	46.91	71.88	80.34	28.26	77.43	30.44	64.29
Lane Group LOS	F	D	E	F	C	E	C	E
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	6.63	12.84	2.69	23.05	1.48	21.87	1.66	19.13
50th-Percentile Queue Length [m/ln]	50.54	97.87	20.52	175.64	11.26	166.65	12.61	145.73
95th-Percentile Queue Length [veh/ln]	10.92	18.72	4.85	31.08	2.66	29.54	2.98	26.30
95th-Percentile Queue Length [m/ln]	83.18	142.66	36.94	236.84	20.27	225.09	22.71	200.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	140.98	46.91	46.91	71.88	80.34	80.34	28.26	77.43	77.43	30.44	64.29	64.29
Movement LOS	F	D	D	E	F	F	C	E	E	C	E	E
d_A, Approach Delay [s/veh]	68.06			79.42			71.38			59.67		
Approach LOS	E			E			E			E		
d_I, Intersection Delay [s/veh]	69.80											
Intersection LOS	E											
Intersection V/C	0.761											

Emissions

Vehicle Kilometers Traveled [km/h]	31.59	108.92	24.07	196.99	22.31	159.06	29.23	184.65
Stops [stops/h]	198.96	385.33	80.80	691.50	44.34	656.11	49.66	573.75
Fuel consumption [L/h]	21.04	34.58	8.03	70.21	4.82	63.01	5.89	57.03
CO [g/h]	388.55	638.55	148.35	1296.42	88.93	1163.50	108.72	1053.13
NOx [g/h]	75.60	124.24	28.86	252.24	17.30	226.38	21.15	204.90
VOC [g/h]	90.05	147.99	34.38	300.46	20.61	269.65	25.20	244.07

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	25.49	28.68	23.46	20.20
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.428	2.362	2.500	2.476
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	633	633	667	667
d_b, Bicycle Delay [s]	28.02	28.02	26.67	26.67
I_b,int, Bicycle LOS Score for Intersection	2.495	2.647	2.617	2.588
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	3	5	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 26: 109 Street and 87 Ave

Control Type:	Signalized	Delay (sec / veh):	230.6
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.083

Intersection Setup

Name	109 Street				109 Street				87 Ave			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration												
Turning Movement	Left	Thru	Thru	Right	Left	Left	Thru	Right	Left	Left	Thru	Right
Lane Width [m]	3.20	3.66	3.20	4.00	3.66	3.66	3.60	4.50	3.50	3.50	3.50	3.50
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Entry Pocket Length [m]	80.00	30.48	30.48	35.00	30.48	30.48	30.48	30.48	30.48	30.48	30.48	45.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00				50.00				50.00			
Grade [%]	0.00				0.00				0.00			
Curb Present	Yes				Yes				Yes			
Crosswalk	Yes				Yes				Yes			

Volumes

Name	109 Street				109 Street				87 Ave			
Base Volume Input [veh/h]	350	806	0	9	0	0	1835	175	532	0	72	243
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	1	0	0	0	18	0	0	0	24
Total Hourly Volume [veh/h]	350	806	0	8	0	0	1835	157	532	0	72	219
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	202	0	2	0	0	459	39	133	0	18	55
Total Analysis Volume [veh/h]	350	806	0	8	0	0	1835	157	532	0	72	219
Presence of On-Street Parking	No			No	No			No	No			No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	106				0				51			
v_di, Inbound Pedestrian Volume crossing th	105				0				51			
v_co, Outbound Pedestrian Volume along th	41				51				105			
v_ci, Inbound Pedestrian Volume along the l	40				51				106			
v_ab, Corner Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycles/h]	19				25				9			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	110
Active Pattern	Pattern 2
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	3.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Overlap	Overlap	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	1	0	3	0	0	1	0	0	0	3	2
Auxiliary Signal Groups	1,2	1,2		1,3								
Maximum Green [s]	30	59	0	26	0	0	59	0	0	0	26	30
Amber [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
All red [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
Walk [s]	0	8	0	7	0	0	8	0	0	0	7	0
Pedestrian Clearance [s]	0	16	0	19	0	0	16	0	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk												
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 2

Split [s]	12	43	0	25	0	0	43	0	0	0	25	12
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	24	0	20	0	0	24	0	0	0	20	5
Vehicle Extension [s]	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	3.0
Minimum Recall	No	Yes		No			Yes				No	
Maximum Recall	Yes	No		No			No				No	
Pedestrian Recall	No	No		Yes			No				Yes	

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	C	R	C	C	L	C	R
C, Calculated Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	50	50	75	38	38	20	20	20
g / C, Green / Cycle	0.46	0.46	0.68	0.35	0.35	0.18	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.78	0.25	0.01	0.59	0.59	0.25	0.31	0.16
s, saturation flow rate [veh/h]	448	3204	1456	1683	1688	1086	1053	1398
c, Capacity [veh/h]	240	1458	992	582	584	243	250	254
d1, Uniform Delay [s]	45.39	21.83	5.58	35.98	35.98	48.42	48.10	43.47
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.47	0.50	0.18
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	227.03	1.51	0.01	327.20	324.92	94.27	169.46	13.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.46	0.55	0.01	1.71	1.71	1.13	1.32	0.86
d, Delay for Lane Group [s/veh]	272.41	23.34	5.60	363.18	360.90	142.70	217.56	56.73
Lane Group LOS	F	C	A	F	F	F	F	E
Critical Lane Group	Yes	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	19.03	7.69	0.06	68.09	67.92	13.09	18.66	6.64
50th-Percentile Queue Length [m/ln]	145.03	58.62	0.45	518.81	517.54	99.74	142.19	50.61
95th-Percentile Queue Length [veh/ln]	32.12	12.24	0.11	106.21	105.88	20.15	29.14	10.87
95th-Percentile Queue Length [m/ln]	244.79	93.28	0.80	809.29	806.83	153.56	222.07	82.82

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	272.41	23.34	0.00	5.60	0.00	0.00	362.13	360.90	178.50	0.00	217.56	56.73
Movement LOS	F	C		A			F	F	F		F	E
d_A, Approach Delay [s/veh]	98.11				362.04				149.83			
Approach LOS	F				F				F			
d_I, Intersection Delay [s/veh]	230.56											
Intersection LOS	F											
Intersection V/C	1.083											

Emissions

Vehicle Kilometers Traveled [km/h]	36.98	85.15	0.85	103.13	103.13	54.10	65.10	43.22
Stops [stops/h]	622.89	503.55	1.92	2228.24	2222.79	428.36	610.70	217.37
Fuel consumption [L/h]	90.92	33.89	0.16	338.38	336.51	44.88	75.17	18.56
CO [g/h]	1678.92	625.80	2.92	6248.36	6213.87	828.81	1387.99	342.68
NOx [g/h]	326.66	121.76	0.57	1215.70	1208.99	161.26	270.05	66.67
VOC [g/h]	389.11	145.03	0.68	1448.12	1440.12	192.09	321.68	79.42

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0				11.0				11.0			
M_corner, Corner Circulation Area [m²/ped]	8.37				54.68				0.00			
M_CW, Crosswalk Circulation Area [m²/ped]	3.92				0.00				5.82			
d_p, Pedestrian Delay [s]	44.55				44.55				44.55			
I_p,int, Pedestrian LOS Score for Intersectio	3.103				2.765				2.614			
Crosswalk LOS	C				C				B			
s_b, Saturation Flow Rate of the bicycle lane	2000				2000				2000			
c_b, Capacity of the bicycle lane [bicycles/h]	909				691				364			
d_b, Bicycle Delay [s]	16.52				23.86				36.98			
I_b,int, Bicycle LOS Score for Intersection	2.521				3.218				2.957			
Bicycle LOS	B				C				C			

Intersection Setup								
Name	87 Ave							
Approach	Westbound				Southwestbound			
Lane Configuration								
Turning Movement	Left	Thru	Right	Right	Left	Thru	Right	Right
Lane Width [m]	3.50	3.66	3.50	3.66	3.66	3.66	3.66	3.66
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0
Entry Pocket Length [m]	30.48	30.48	30.48	10.00	30.48	30.48	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	30.00				50.00			
Grade [%]	0.00				0.00			
Curb Present	Yes							
Crosswalk	Yes				Yes			

Volumes

Name	87 Ave							
Base Volume Input [veh/h]	59	0	0	197	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00							
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	20	0	0	0	0
Total Hourly Volume [veh/h]	59	0	0	177	0	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	0	0	44	0	0	0	0
Total Analysis Volume [veh/h]	59	0	0	177	0	0	0	0
Presence of On-Street Parking	No			No				
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	40				0			
v_di, Inbound Pedestrian Volume crossing th	41				0			
v_co, Outbound Pedestrian Volume along th	0				0			
v_ci, Inbound Pedestrian Volume along the l	0				0			
v_ab, Corner Pedestrian Volume [ped/h]	0				0			
Bicycle Volume [bicycles/h]	0				0			

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	110
Active Pattern	Pattern 2
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	3.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	3	0	0	0	0	0	0	0
Auxiliary Signal Groups								
Maximum Green [s]	26	0	0	0	0	0	0	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All red [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk [s]	7	0	0	0	0	0	0	0
Pedestrian Clearance [s]	19	0	0	0	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk								
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 2

Split [s]	25	0	0	0	0	0	0	0
Lead / Lag	Lag	-	-	-	-	-	-	-
Minimum Green [s]	20	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No							
Maximum Recall	No							
Pedestrian Recall	Yes							

Exclusive Pedestrian Phase

Pedestrian Signal Group	4
Pedestrian Walk [s]	7
Pedestrian Clearance [s]	23

Lane Group Calculations

Lane Group	L	R	
C, Calculated Cycle Length [s]	110	110	
L, Total Lost Time per Cycle [s]	5.00	5.00	
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	
l2, Clearance Lost Time [s]	3.00	3.00	
g_i, Effective Green Time [s]	20	20	
g / C, Green / Cycle	0.18	0.18	
(v / s)_i Volume / Saturation Flow Rate	0.06	0.12	
s, saturation flow rate [veh/h]	979	1431	
c, Capacity [veh/h]	65	260	
d1, Uniform Delay [s]	55.00	42.02	
k, delay calibration	0.11	0.11	
l, Upstream Filtering Factor	1.00	1.00	
d2, Incremental Delay [s]	31.69	3.12	
d3, Initial Queue Delay [s]	0.00	0.00	
Rp, platoon ratio	1.00	1.00	
PF, progression factor	1.00	1.00	

Lane Group Results

X, volume / capacity	0.90	0.68	
d, Delay for Lane Group [s/veh]	86.69	45.13	
Lane Group LOS	F	D	
Critical Lane Group	No	No	
50th-Percentile Queue Length [veh/ln]	2.24	4.80	
50th-Percentile Queue Length [m/ln]	17.06	36.55	
95th-Percentile Queue Length [veh/ln]	4.03	8.39	
95th-Percentile Queue Length [m/ln]	30.71	63.91	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	86.69	0.00	0.00	45.13	0.00	0.00	0.00	0.00
Movement LOS	F			D				
d_A, Approach Delay [s/veh]	55.52				0.00			
Approach LOS	E				A			
d_I, Intersection Delay [s/veh]	230.56							
Intersection LOS	F							
Intersection V/C	1.083							

Emissions

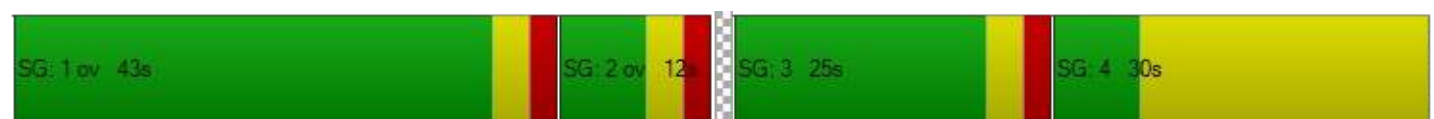
Vehicle Kilometers Traveled [km/h]	2.14	6.43	
Stops [stops/h]	73.27	156.96	
Fuel consumption [L/h]	4.79	8.19	
CO [g/h]	88.40	151.23	
NOx [g/h]	17.20	29.42	
VOC [g/h]	20.49	35.05	

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0
M_corner, Corner Circulation Area [m²/ped]	0.00	0.00
M_CW, Crosswalk Circulation Area [m²/ped]	14.11	0.00
d_p, Pedestrian Delay [s]	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersectio	2.046	3.296
Crosswalk LOS	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	364	0
d_b, Bicycle Delay [s]	36.82	55.00
I_b,int, Bicycle LOS Score for Intersection	1.560	4.132
Bicycle LOS	A	D

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 29: 114 Street and 82 Ave

Control Type:	Signalized	Delay (sec / veh):	111.3
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.784

Intersection Setup

Name	114 Street			114 Street			University Ave			82 Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵			↵↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [m]	3.50	3.70	3.60	3.66	3.60	3.60	4.00	3.60	3.60	3.66	3.66	3.66
No. of Lanes in Entry Pocket	2	0	1	0	0	1	1	0	1	2	0	0
Entry Pocket Length [m]	170.00	30.48	2.00	30.48	30.48	105.00	95.00	30.48	95.00	100.00	30.48	30.48
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [m]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [km/h]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	Yes			Yes			Yes			Yes		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	114 Street			114 Street			University Ave			82 Ave		
Base Volume Input [veh/h]	624	314	274	0	1054	33	20	302	806	289	304	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	27	0	0	3	0	0	0	0	0	2
Total Hourly Volume [veh/h]	624	314	247	0	1054	33	20	302	806	289	304	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	156	79	62	0	264	8	5	76	202	72	76	4
Total Analysis Volume [veh/h]	624	314	247	0	1054	33	20	302	806	289	304	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	4			2			3			2		
v_di, Inbound Pedestrian Volume crossing m	3			2			4			2		
v_co, Outbound Pedestrian Volume crossing	13			0			0			13		
v_ci, Inbound Pedestrian Volume crossing mi	13			0			0			13		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	142
Active Pattern	Pattern 2
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing (Basic)

Control Type	Protecte	Overlap	Permiss	Permiss	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	2	1	0	0	1	2	3	6	2	5	4	0
Auxiliary Signal Groups		1,2				1,2			2,6			
Maximum Green [s]	38	33	0	0	33	38	10	38	38	16	38	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	3.0	3.0	0.0	0.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	0	9	0	0	9	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	0	0	24	0	0	22	0	0	22	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	0.0	0.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	0.0
Detector Location [m]	1.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0
Detector Length [m]	5.0	5.0	0.0	0.0	5.0	5.0	5.0	0.0	0.0	5.0	5.0	0.0
Advanced Detector Location [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [m]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 2

Split [s]	44	39	0	0	39	44	17	36	44	23	42	0
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	10	27	0	0	27	10	7	29	10	7	29	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Minimum Recall	No	Yes			Yes	No	No	No	No	No	No	
Maximum Recall	No	No			No	No	No	Yes	No	No	Yes	
Pedestrian Recall	No	No			No	No	No	No	No	No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	R	L	C	C
C, Calculated Cycle Length [s]	151	151	151	151	151	151	151	151	151	151	151
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	4.00	4.00	0.00	5.00	5.00	0.00	5.00	5.00	5.00
g_i, Effective Green Time [s]	38	77	33	33	77	4	38	82	16	50	50
g / C, Green / Cycle	0.25	0.51	0.22	0.22	0.51	0.03	0.25	0.54	0.10	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.26	0.10	0.17	0.33	0.03	0.01	0.10	0.35	0.09	0.10	0.10
s, saturation flow rate [veh/h]	2404	3204	1431	3204	1318	1535	2951	2325	3113	1550	1522
c, Capacity [veh/h]	622	1636	313	701	673	41	744	1264	327	511	502
d1, Uniform Delay [s]	58.80	20.03	55.63	58.91	18.53	72.35	47.01	24.00	66.60	37.79	37.80
k, delay calibration	0.11	0.11	0.27	0.24	0.11	0.11	0.50	0.20	0.11	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.70	0.06	10.39	230.15	0.03	8.49	1.65	1.02	7.93	1.61	1.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.00	0.19	0.79	1.50	0.05	0.48	0.41	0.64	0.88	0.32	0.32
d, Delay for Lane Group [s/veh]	76.50	20.09	66.02	289.07	18.56	80.84	48.66	25.01	74.53	39.40	39.45
Lane Group LOS	F	C	E	F	B	F	D	C	E	D	D
Critical Lane Group	Yes	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	13.64	3.07	9.80	35.78	0.60	0.86	4.95	10.15	5.87	4.75	4.68
50th-Percentile Queue Length [m/ln]	103.93	23.41	74.67	272.66	4.58	6.59	37.71	77.32	44.70	36.20	35.70
95th-Percentile Queue Length [veh/ln]	19.74	5.53	14.93	54.88	1.08	1.56	8.60	15.37	9.84	8.32	8.23
95th-Percentile Queue Length [m/ln]	150.42	42.14	113.80	418.22	8.24	11.86	65.51	117.13	74.97	63.43	62.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.50	20.09	66.02	0.00	289.07	18.56	80.84	48.66	25.01	74.53	39.42	39.45
Movement LOS	F	C	E		F	B	F	D	C	E	D	D
d_A, Approach Delay [s/veh]	59.37			280.86			32.33			56.08		
Approach LOS	E			F			C			E		
d_I, Intersection Delay [s/veh]	111.32											
Intersection LOS	F											
Intersection V/C	0.784											

Emissions

Vehicle Kilometers Traveled [km/h]	176.63	88.88	69.92	243.63	7.63	6.58	99.30	265.01	47.95	26.75	26.34
Stops [stops/h]	651.04	146.65	233.90	1708.10	14.33	20.64	236.23	484.38	280.01	113.37	111.81
Fuel consumption [L/h]	68.18	16.61	24.46	296.14	1.52	2.33	26.06	51.61	27.43	9.98	9.84
CO [g/h]	1258.90	306.62	451.65	5468.47	28.05	43.10	481.30	953.02	506.56	184.30	181.69
NOx [g/h]	244.94	59.66	87.88	1063.97	5.46	8.39	93.64	185.42	98.56	35.86	35.35
VOC [g/h]	291.76	71.06	104.67	1267.37	6.50	9.99	111.55	220.87	117.40	42.71	42.11

Other Modes

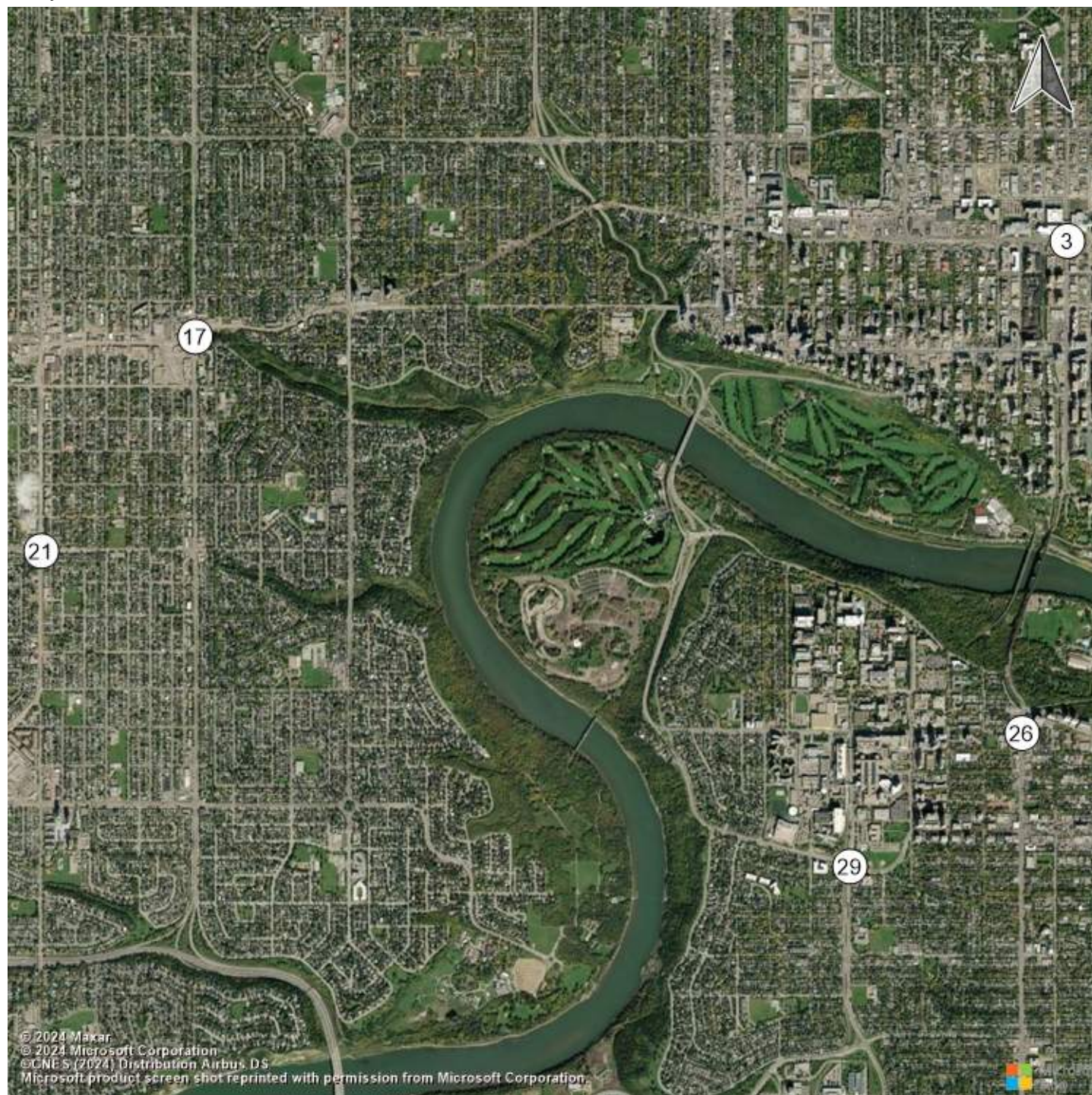
g_Walk,mi, Effective Walk Time [s]	11.0			11.0			13.0			13.0		
M_corner, Corner Circulation Area [m²/ped]	25.12			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [m²/ped]	0.00			245.97			0.00			26.04		
d_p, Pedestrian Delay [s]	64.82			64.82			62.98			62.98		
I_p,int, Pedestrian LOS Score for Intersectio	3.012			2.620			3.807			2.679		
Crosswalk LOS	C			B			D			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1021			438			385			464		
d_b, Bicycle Delay [s]	18.07			46.03			49.20			44.48		
I_b,int, Bicycle LOS Score for Intersection	2.560			2.459			2.490			2.064		
Bicycle LOS	B			B			B			B		

Sequence

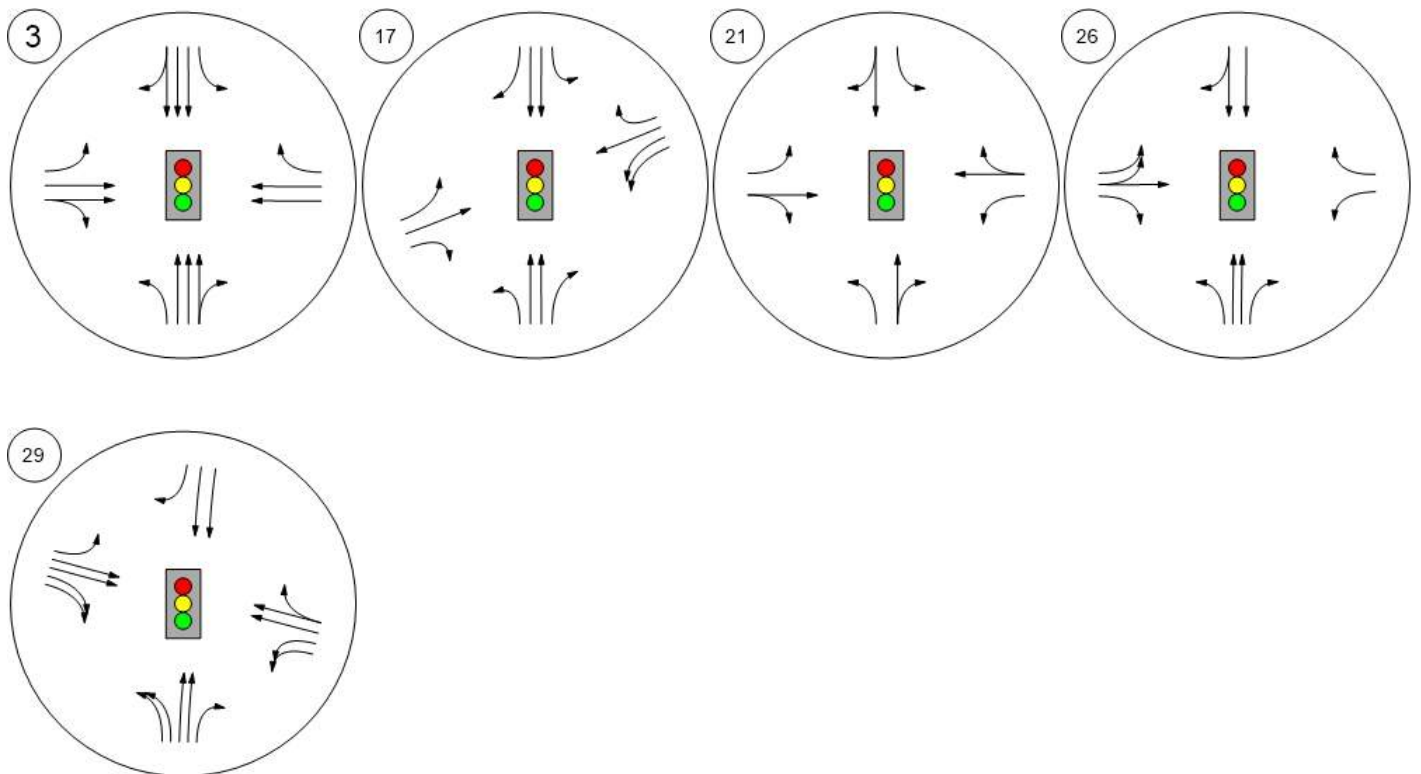
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Ring 2	-	-	6	5	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



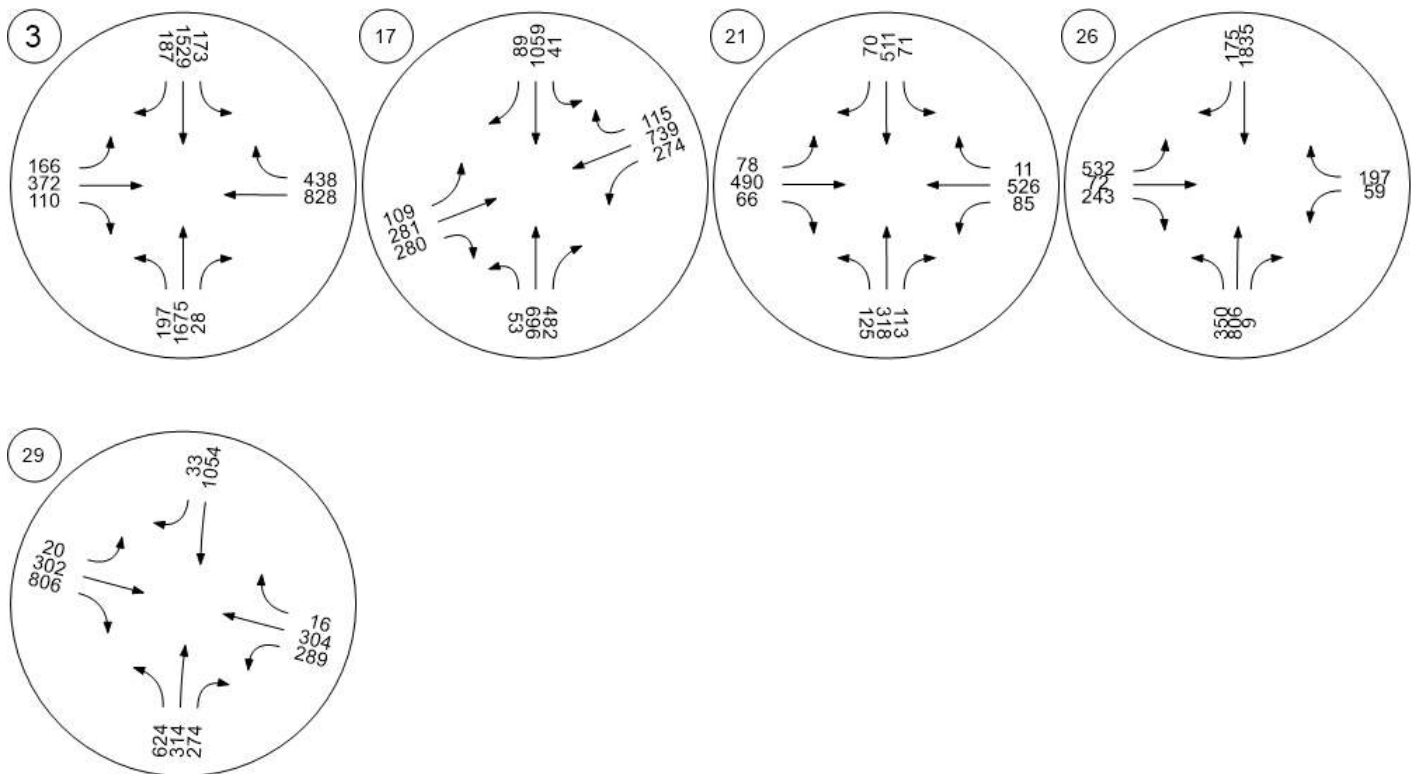
Study Intersections



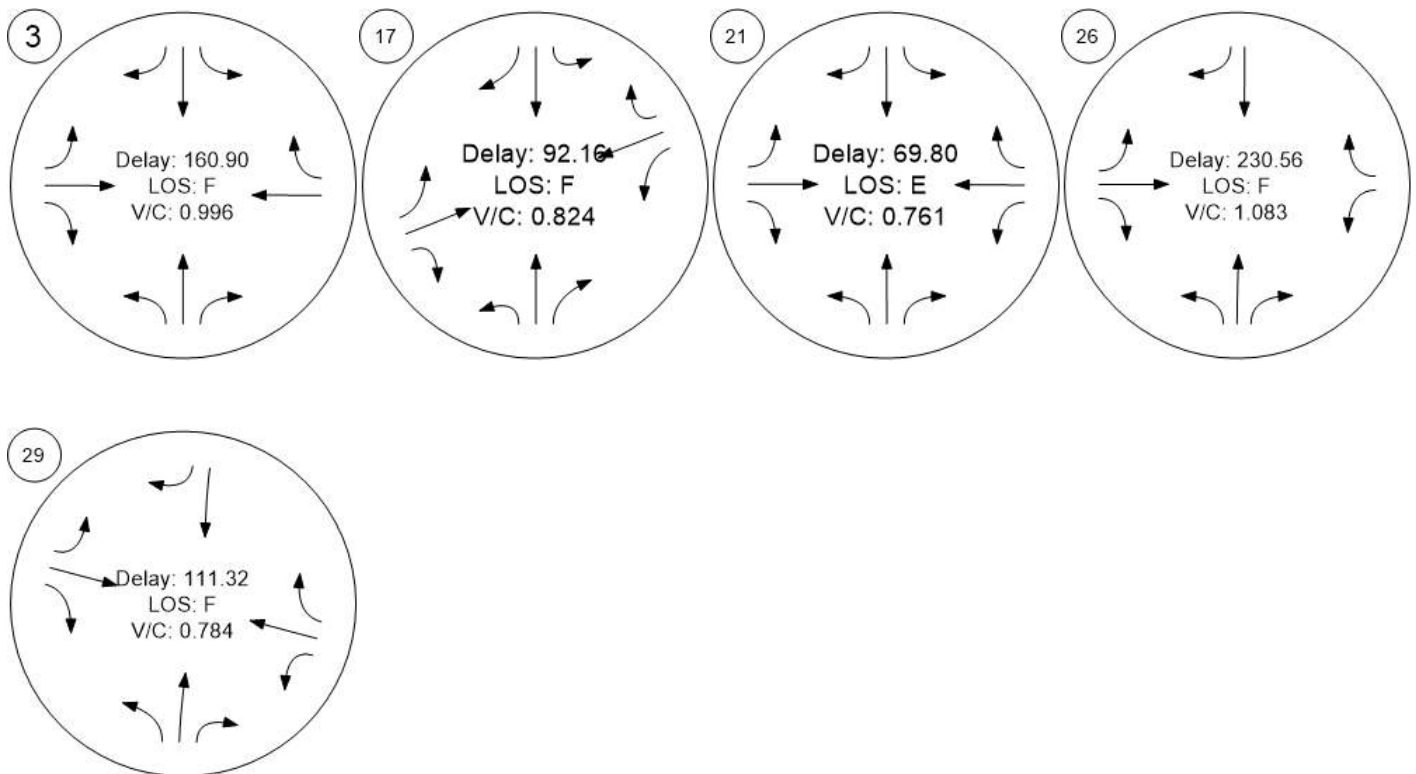
Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Traffic Conditions



K

Appendix K Cost Estimates



124 Street / Wihkwêntôwin Area**109 Street / 100 Avenue**

	Qty	Unit Cost	Total Cost
Reconstruct Curb Ramps	4	\$ 5,000	\$ 20,000
TWSIs	4	\$ 800	\$ 3,200
Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 3,780
Contingency	50%		\$ 14,490
Total (Rounded)			\$ 45,000

109 Street / Jasper Avenue

Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 300
Contingency	50%		\$ 1,150
Total (Rounded)			\$ 5,000

109 Street / 104 Avenue

Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 300
Contingency	50%		\$ 1,150
Total (Rounded)			\$ 5,000

124 Street / 102 Avenue

Add No RTOR Signage	1	\$ 500	\$ 500
Design	15%		\$ 75
Contingency	50%		\$ 288
Total (Rounded)			\$ 1,000

Reconstruction / reconfiguration of 102 Avenue East of 124 Street is assumed to be included as part of the neighbourhood renewal and has not been estimated.

124 Street / Stony Plain Road

Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 300
Contingency	50%		\$ 1,150
Total (Rounded)			\$ 5,000

124 Street / 107 Avenue

Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 300
Contingency	50%		\$ 1,150
Total (Rounded)			\$ 5,000

124 Street / Wihkwêntôwin Area

124 Street / 111 Avenue

Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	300
Contingency	50%			\$	1,150
Total (Rounded)				\$	5,000

124 Street / 118 Avenue

No changes recommended					
Design	15%			\$	-
Contingency	50%			\$	-
Total (Rounded)				\$	-

121 Street / Stony Plain Road

Add No LT On Red Signage	1	\$	500	\$	500
Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	375
Contingency	50%			\$	1,438
Total (Rounded)				\$	5,000

Reconstruction / reconfiguration of 121 Street painted bike lanes is assumed to be included as part of the neighbourhood renewal and has not been estimated.

121 Street / Jasper Avenue

Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	300
Contingency	50%			\$	1,150
Total (Rounded)				\$	5,000

116 Street / Stony Plain Road

Add No LT On Red Signage	2	\$	500	\$	1,000
Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	450
Contingency	50%			\$	1,725
Total (Rounded)				\$	6,000

116 Street / Jasper Avenue

Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	300
Contingency	50%			\$	1,150
Total (Rounded)				\$	5,000

124 Street / Wihkwentôwin Area

116 Street / 100 Avenue

	Qty	Unit Cost	Total Cost
Reconstruct Curb Ramps	4	\$ 5,000	\$ 20,000
TWSIs	4	\$ 800	\$ 3,200
Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 3,780
Contingency	50%		\$ 14,490
Total (Rounded)			\$ 45,000

112 Street / Stony Plain Road

Add No LT On Red Signage	2	\$ 500	\$ 1,000
Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 450
Contingency	50%		\$ 1,725
Total (Rounded)			\$ 6,000

Missing Pedestrian Links

	Qty	Unit Cost	Total Cost
119 Street S 104 Ave	85	**	\$ -
118 Street S 104 Ave	155	**	\$ -
109 Avenue E 124 St	55	\$ 300	\$ 16,500
110 Avenue E 124 St	55	\$ 300	\$ 16,500
Design	15%		\$ 4,950
Contingency	50%		\$ 18,975
Total (Rounded)			\$ 60,000

Construction of the missing sidewalk links along 118 Street and 119 Street is assumed to be included as part of the neighbourhood renewal and has not been estimated.

Missing Cycling Links

	Qty	Unit Cost	Total Cost
123 Street LRT Connection - Shared Street Facility	710	\$ 400	\$ 284,000
Victoria Promenade Bike Lane Upgrades	660	**	\$ -
121 Street Bike Lane Upgrades	1000	**	\$ -
100 Avenue Bike Lane - Protected Separate Facility	870	**	\$ -
Ped Signal Bike Actuation Retrofit - 124 St / 106 Ave	1	\$ 100,000	\$ 100,000
Ped Signal Bike Actuation Retrofit - 124 St / 109A Ave	1	\$ 100,000	\$ 100,000
Design	15%		\$ 72,600
Contingency	50%		\$ 278,300
Total (Rounded)			\$ 840,000

Reconstruction / reconfiguration of 121 Street painted bike lanes and Victoria Promenade bike lanes is assumed to be included as part of the neighbourhood renewal and has not been estimated.

156 Street / Stony Plain Road**Stony Plain Road / 102 Avenue**

	Qty	Unit Cost	Total Cost
Cycling Wayfinding	4	\$ 500	\$ 2,000
Design	15%		\$ 300
Contingency	50%		\$ 1,150
Total (Rounded)			\$ 5,000

Stony Plain Road / 142 Street

Add No RTOR Signage	3	\$ 500	\$ 1,500
Add SB Bus Queue Jump Signal	1	\$ 35,000	\$ 35,000
Channelized Crossing RRFB	1	\$ 50,000	\$ 50,000
Design	15%		\$ 12,975
Contingency	50%		\$ 49,738
Total (Rounded)			\$ 150,000

Stony Plain Road / 149 Street

Remove Right Turn Channelization	3	\$ 400,000	\$ 1,200,000
Design	15%		\$ 180,000
Contingency	50%		\$ 690,000
Total (Rounded)			\$ 3,000,000

Stony Plain Road / 156 Street

Add No LT On Red Signage	1	\$ 500	\$ 500
Add No RTOR Signage	4	\$ 500	\$ 2,000
Design	15%		\$ 375
Contingency	50%		\$ 1,438
Total (Rounded)			\$ 5,000

Stony Plain Road / 158 Street

Add Curb Ramps on West Side	1	\$ 5,000	\$ 5,000
Add Ped Signal Heads + Button on West Side	1	\$ 100,000	\$ 100,000
Design	15%		\$ 15,750
Contingency	50%		\$ 60,375
Total (Rounded)			\$ 185,000

156 Street / Stony Plain Road

Stony Plain Road 163 Street

Rebuild Curb Ramps & Curb Radii	4	\$	19,200	\$	76,800
TWSIs	4	\$	800	\$	3,200
Add No LT On Red Signage	4	\$	500	\$	2,000
Add No RTOR Signage	3	\$	500	\$	1,500
Design	15%			\$	12,525
Contingency	50%			\$	48,013
Total (Rounded)				\$	145,000

156 Street / 95 Avenue

Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	300
Contingency	50%			\$	1,150
Total (Rounded)				\$	5,000

Meadowlark Road / 87 Avenue

Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	300
Contingency	50%			\$	1,150
Total (Rounded)				\$	5,000

Implementation of EB and WB bus priority measures, including lane reassignment, assumed to be part of future B2 BRT corridor improvements and have not been estimated

156 Street / Stony Plain Road**Missing Pedestrian Links**

	Qty	Unit Cost		Total Cost	
103 Avenue (137 St - 140 St)	350	\$	300	\$	105,000
103 Avenue (142 St - 144 St)	180	\$	300	\$	54,000
143 Street (SPR - 103 Ave)	110	\$	300	\$	33,000
144 Street S of SPR	75	\$	300	\$	22,500
102 Avenue (149 St to 163 St)	1600	\$	300	\$	480,000
158 Street N. 100 Avenue	100	\$	300	\$	30,000
160 Street N. 100 Avenue	100	\$	300	\$	30,000
99 Avenue E 156 Street	100	\$	300	\$	30,000
99 Avenue W 156 Street	100	\$	300	\$	30,000
98 Avenue W 156 Street	100	\$	300	\$	30,000
97 Avenue E 156 Street	100	\$	300	\$	30,000
97 Avenue W 156 Street	100	\$	300	\$	30,000
96 Avenue E 156 Street	100	\$	300	\$	30,000
93a Avenue E 156 Street	100	\$	300	\$	30,000
93a Avenue W 156 Street	100	\$	300	\$	30,000
92a Avenue E 156 Street	100	\$	300	\$	30,000
91 Avenue (154 St - 156 St)	210	\$	300	\$	63,000
90 Ave E Meadowlark Rd	100	\$	300	\$	30,000
156 Street S. Meadowlark Rd	120	\$	300	\$	36,000
Design	15%			\$	175,000
Contingency	50%			\$	704,000.00
Total (Rounded)				\$	2,100,000

Missing Cycling Links

	Qty	Unit Cost		Total Cost	
158 Street Shared Street Facility	2000	\$	400	\$	800,000
158 Street Bike Signals	3	\$	100,000	\$	300,000
Design	15%			\$	165,000
Contingency	50%			\$	632,500
Total (Rounded)				\$	1,900,000

Garneau

82 Avenue / 114 Street

Add Ped Crossing West of LRT Tracks	2	\$	5,000	\$	10,000
TWSIs	2	\$	800	\$	1,600
Add Pedestrian Signal Heads for Crossing	2	\$	15,000	\$	30,000
Add No LT On Red Signage	2	\$	500	\$	1,000
Reconfigure NB to EB RT to Simple Radius	1	\$	400,000	\$	400,000
Widen South Side Curb Ramps	2	\$	5,000	\$	10,000
TWSIs	2	\$	800	\$	1,600
Design	15%			\$	68,130
Contingency	50%			\$	261,165
Total (Rounded)				\$	335,000

82 Avenue / 114 Street

Add Curb Ramp in NW Corner	1	\$	500	\$	500
Revise Curb Approaches in SE and NE Corners	2	\$	400,000	\$	800,000
Shared Pathway 82 to 83 Ave	120	\$	1,000	\$	120,000
Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	138,375
Contingency	50%			\$	530,438
Total (Rounded)				\$	675,000

82 Avenue / 109 Street

Add No LT On Red Signage	4	\$	500	\$	2,000
Design	15%			\$	300
Contingency	50%			\$	1,150
Total (Rounded)				\$	5,000

109 Street / 83 Avenue

No Changes Recommended				\$	-
Design	15%			\$	-
Contingency	50%			\$	-
Total (Rounded)				\$	-

Garneau

109 Street / 86 Avenue

Convert to RI/RO Operations - Extend Median	30	\$	900	\$	27,000
Curb Ramps	4	\$	5,000	\$	20,000
TWSI	4	\$	800	\$	3,200
Continuous Corssing on East Leg	1	\$	65,000	\$	65,000
RRFB (with Median Light)	1	\$	75,000	\$	75,000
Design	15%			\$	28,530
Contingency	50%			\$	109,365
Total (Rounded)				\$	330,000

109 Street / 87 Avenue

Add North Crossing Curb Ramps	2	\$	5,000	\$	10,000
TWSIs	2	\$	800	\$	1,600
Convert to Scramble (Additional Ped Heads)	6	\$	5,000	\$	30,000
Add No RTOR Signage	3	\$	500	\$	1,500
Design	15%			\$	6,465
Contingency	50%			\$	24,783
Total (Rounded)				\$	80,000

109 Street / Saskatchewan Drive / 88 Avenue / Walterdale Hill Road

Reconstruct Islands & Curb Ramps	10	\$	20,000	\$	200,000
Wayfinding Signage	4	\$	500	\$	2,000
Design	15%			\$	30,300
Contingency	50%			\$	116,150
Total (Rounded)				\$	350,000

87 Avenue / 110 Street

No Changes Recommended				\$	-
Design	15%			\$	-
Contingency	50%			\$	-
Total (Rounded)				\$	-

Garneau

87 Avenue / 114 Street

Rebuild Curb Ramps	4	\$	5,000	\$	20,000
TWSIs	4	\$	800	\$	3,200
Add Audible Signals and Call Buttons	4	\$	2,500	\$	10,000
Add No LT On Red Signage	4	\$	500	\$	2,000
Add No RTOR Signage	4	\$	500	\$	2,000
Design	15%			\$	5,580
Contingency	50%			\$	21,390
Total (Rounded)				\$	65,000

Missing Pedestrian Links

Qty Unit Cost Total Cost

None identified.

Design	15%	\$	-
Contingency	50%	\$	-
Total (Rounded)		\$	-

Missing Cycling Links

Qty Unit Cost Total Cost

None identified.

Design	15%	\$	-
Contingency	50%	\$	-
Total (Rounded)		\$	-