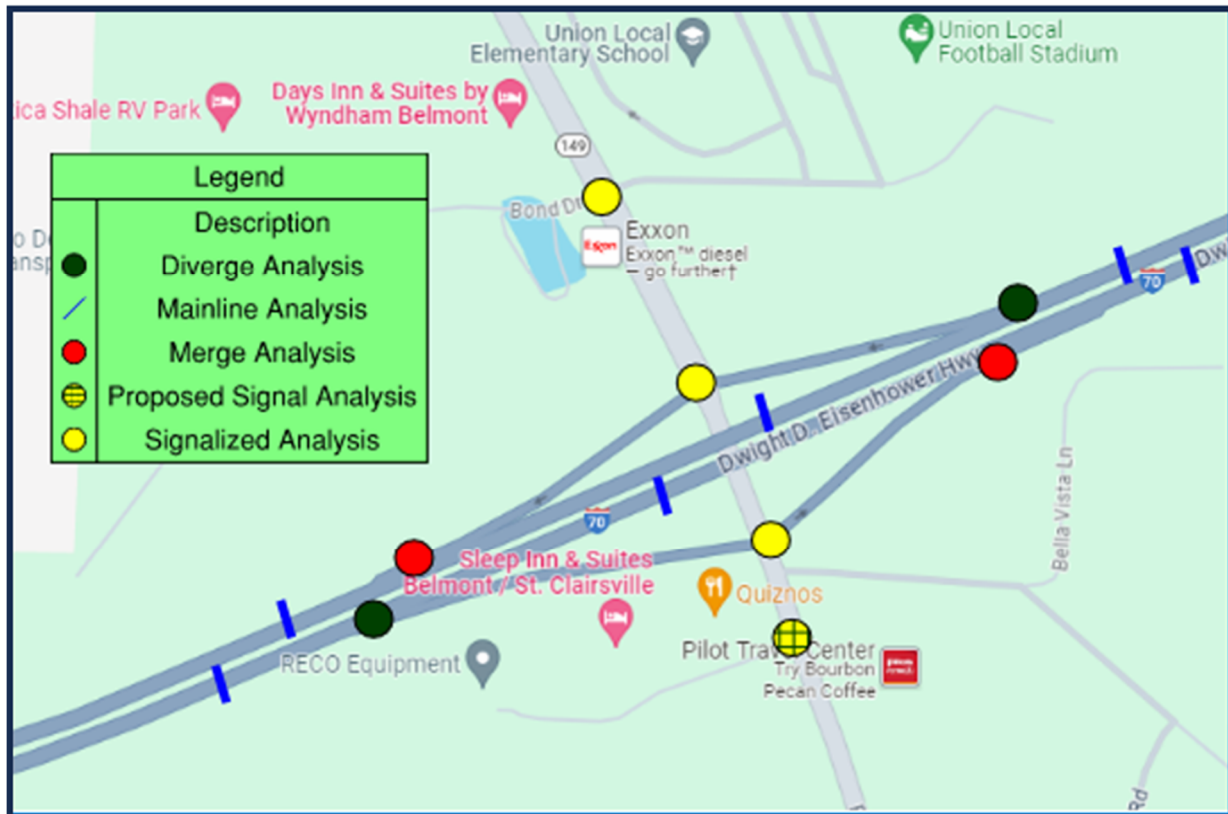


# BEL-70 & SR149 INTERCHANGE OPERATIONS STUDY

## Project Summary

<b>Location</b>	IR70 & SR149 Interchange, near Belmont, Ohio
	Belmont County
<b>PID</b>	120547
<b>Study Sponsor</b>	ODOT, District 11
<b>Proposed Work</b>	Add left turn lane to westbound exit ramp; between the ramps add a northbound left turn lane, southbound through lane and southbound left turn lane; relocate Reco Dr south to the Pilot car access; between Reco and the eastbound ramps add a second through lane southbound with a left turn lane and right turn lane at new Reco Dr, add second through lane northbound and add continuous right turn lane northbound onto the eastbound entrance ramp; relocate Pilot truck entrance to line up with new Love's truck entrance; between relocated Reco Dr and truck entrance add a right turn and left turn lane southbound, add through lane and left turn lane northbound; south of truck entrance add a left turn lane northbound.

## Study Area



## HCM Analysis Points

### Freeway Analysis

- EB & WB IR70, upstream of the SR149 Diverge
- EB & WB IR70, between Diverge and Merge of SR149
- EB & WB IR70, downstream of the SR149 Diverge

### Ramp Analysis

- EB & WB Diverge to SR149
- EB & WB Merge from SR149

### Intersection Analysis

- SR149 at Bond Drive
- SR149 at WB Ramps
- SR149 at EB Ramps
- SR149 at Reco Drive
- SR149 at Pilot/Love's Truck Drive

## Problem Description

A new Love's Travel Stop is being constructed on property on the west side of SR149 just south of the IR70/SR149 interchange. This development will increase the traffic, both cars and trucks at the interchange and along SR149 to Reco Drive and the new Love's truck access. An analysis of the increased traffic using Transmodeler revealed that backups are expected onto mainline IR70 westbound and ramp intersections with resulting levels of service F.

## Traffic Analysis

### Posted Speed Limits

- Interstate, IR 70 – 70 mph.
- Mainline, SR 149 – 45 mph.
- Sideroad, Reco Drive – 25 mph.
- Sideroad, Bond Drive (west leg)- 25 mph.
- Sideroad, Bond Drive, (east leg) – 35 mph.

### Freeway and Ramp Analysis Results:

Segment	Type	2047 AM (MID) [PM] No Build		2047 AM (MID) [PM] Build	
		LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<i>Eastbound</i>					
US40 to SR 149	Basic	B (B) [D]	13.6 (15.7) [30.3]	B (B) [C]	13.6 (15.7) [18.1]
I-70 EB Off-Ramp to SR 149	Diverge	B (B) [E]	12.2 (14.0) [43.1]	B (B) [B]	12.3 (14.2) [16.3]
I-70 EB Off-Ramp to I-70 EB On-Ramp	Basic	B (B) [B]	11.5 (13.6) [15.7]	B (B) [B]	11.7 (13.4) [15.0]
I-70 EB On-Ramp from SR 149	Merge	B (B) [B]	15.2 (16.6) [18.2]	B (B) [B]	16.3 (16.8) [18.6]
SR 149 to Rest Area	Basic	B (B) [B]	16.5 (17.3) [17.4]	B (B) [C]	17.3 (17.4) [20.3]
<i>Westbound</i>					
Rest Area to SR 149	Basic	F (C) [F]	70.6 (19.2) [107.9]	B (C) [C]	13.2 (18.7) [19.6]
I-70 WB Off-Ramp to SR 149	Diverge	F (D) [F]	76.3 (34.0) [94.6]	B (B) [B]	11.8 (17.2) [18.2]
I-70 WB Off-Ramp to I-70 WB On-Ramp	Basic	A (B) [A]	8.4 (14.8) [10.3]	A (B) [B]	9.3 (13.9) [13.5]
I-70 WB On-Ramp from SR 149	Merge	A (B) [A]	8.4 (14.3) [9.2]	B (B) [B]	10.4 (13.6) [14.0]
SR 149 to US40	Basic	A (B) [A]	9.0 (15.8) [10.5]	B (B) [B]	11.6 (16.2) [16.6]

### Intersection Analysis Results:

Intersection	Approach	2047 AM (MID) [PM] No Build	2047 AM (MID) [PM] Build
		LOS	LOS
SR 149 & Bond Dr	NB	A (A) [A]	A (A) [A]
	SB	B (A) [F]	A (A) [A]
	EB	C (C) [F]	C (C) [C]
	WB	D (C) [F]	C (C) [D]
SR 149 & I-70 WB Ramp	NB	D (C) [F]	A (B) [C]
	SB	E (E) [F]	B (B) [C]
	WB	F (F) [F]	C (C) [C]
SR 149 & I-70 EB Ramp	NB	C (D) [D]	A (A) [A]
	SB	D (C) [D]	B (A) [A]
	EB	D (D) [F]	B (B) [C]
SR 149 & Reco Drive (new Signalized Intersection)	NB	F (C) [F]	B (B) [B]
	SB	B (B) [B]	B (B) [B]
	EB	D (D) [F]	B (C) [C]
	WB	-	C (C) [C]
SR 149 & Loves Truck Access (new Signalized Intersection)	NB	-	B (B) [C]
	SB	-	A (A) [A]
	EB	-	E (D) [E]
	WB	-	B (B) [B]

Note: Bond and the Ramp intersections listed above are all currently signalized.

**Intersection Queue Length:**

Intersection	Approach/ Movement		2047 AM (MID [PM]) - Build	
			95 <sup>th</sup> ile Queue (ft)	Queue/Storage Ratio
SR 149 & Bond Drive	NB	L	0 (0) [1]	0 (0) [0]
		T	6 (3) [10]	0 (0) [0]
		R	0 (0) [0]	0 (0) [0]
	SB	L	11 (0) [0]	0.1 (0) [0]
		T	5 (1) [10]	-
		R	0 (0) [0]	0 (0) [0]
	EB	L	29 (55) [16]	0.1 (0.2) [0.1]
		TR	21 (30) [42]	-
	WB	L	31 (16) [45]	0.2 (0.1) [0.2]
TR		12 (11) [10]	-	
SR 149 & I70 WB RAMP	NB	T	0 (17) [148]	0 (0) [0.3]
		L	172 (143) [235]	0.4 (0.3) [0.5]
	SB	TR	139 (125) [270]	0.2 (0.2) [0.5]
		L	126 (187) [234]	0.2 (0.3) [0.4]
	WB	TL	109 (158) [207]	0.1 (0.1) [0.2]
		R	44 (24) [21]	0.1 (0.1) [0.1]
SR 149 & I70 EB RAMP	NB	T	58 (54) [115]	0.1 (0.1) [0.3]
		R	0 (0) [0]	0 (0) [0]
	SB	T	60 (20) [15]	0.1 (0) [0]
		L	63 (23) [39]	0.1 (0.1) [0.1]
	EB	TL	39 (73) [59]	0 (0.1) [0]
		R	76 (65) [172]	0.2 (0.1) [0.4]
SR 149 & Reco Drive	NB	L	16 (8) [18]	0.1 (0.1) [0.2]
		TR	184 (131) [177]	0.5 (0.4) [0.5]
	SB	L	28 (10) [10]	0.2 (0.1) [0.1]
		T	168 (218) [292]	0.4 (0.5) [0.7]
		R	2 (3) [2]	0 (0) [0]
	EB	L	80 (107) [83]	0.2 (0.3) [0.2]
		RT	23 (18) [18]	-
	WB	LTR	47 (50) [61]	-
SR 149 & Loves Truck Access	NB	L	63 (0) [0]	0.1 (0) [0]
		TR	212 (145) [246]	-
	SB	L	70 (109) [87]	0.3 (0.5) [0.4]
		T	103 (63) [17]	0.3 (0.2) [0]
		R	0 (0) [0]	0 (0) [0]
	EB	LTR	253 (112) [421]	-
	WB	LTR	84 (108) [150]	-

**Storage Lengths:**

Intersection /Turn Lane	2047 DHV for Turn Lane			Required Turn Lane Storage#	Potential Thru Lane Backup	Available Storage Length	Proposed Turn Lane Length
	AM veh/hr	MID veh/hr	PM veh/hr				
<b>SR 149 &amp; Bond Drive</b>	<b>90 sec cycle</b>	<b>110 sec. cycle</b>	<b>120 sec. cycle</b>				
EBL	10	10	10	125'	100'	270'	175'
NBL	10	20	10	125'	475'	250'	525'
NBR	20	20	170	125'	475'	150'	525'
WBL	10	10	10	125'	100'	190'	175'
SBL	10	10	10	125'	450'	220'	500'
SBR	10	10	60	125'	450'	220'	500'
<b>SR 149 &amp; I70 WB Ramp</b>	<b>90 sec cycle</b>	<b>110 sec. cycle</b>	<b>120 sec. cycle</b>				
NBL	190	180	170	325'	475'	440'	525'
WBL	520	400	280	550'	50'	600'	600'
WBR	180	160	180	275'	50'	350'	325'
<b>SR 149 &amp; I70 EB Ramp</b>	<b>90 sec cycle</b>	<b>110 sec. cycle</b>	<b>120 sec. cycle</b>				
EBR	220	170	170	325'	150'	425'	375'
SBL	160	110	170	250'	625'	440'	300'
<b>SR 149 &amp; Reco Drive</b>	<b>90 sec cycle</b>	<b>110 sec. cycle</b>	<b>120 sec. cycle</b>				
EBL	10	10	10	125'	100'	350'	175'
NBL	60	60	55	175'	425'	345'	475'
SBL	50	40	60	175'	375'	160'	425'
SBR	95	170	230	325'	375'	160'	425'
<b>SR 149 &amp; Loves Truck Access</b>	<b>90 sec cycle</b>	<b>110 sec. cycle</b>	<b>120 sec. cycle</b>				
NBL	0	0	55	125'	825'	475'	875'
SBL	70	90	50	225'	675'	220'	725'
SBR	95	30	10	225'	675'	360'	725'

#-Does not include 50' taper

*Required Storage Length*- length needed based upon turning volume.

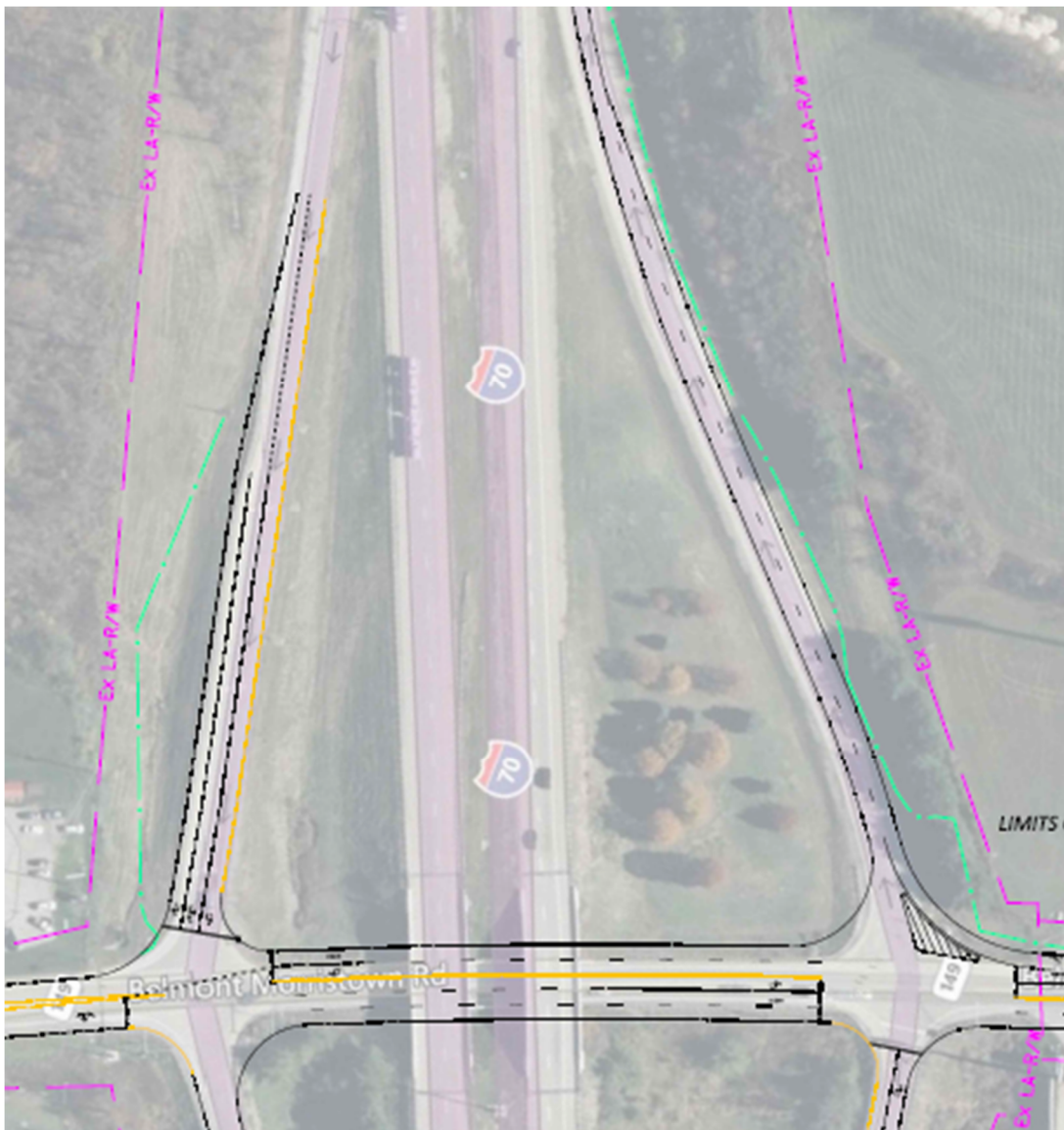
*Available Storage Length* – distance between intersections based upon the design.

*Proposed Turn Lane Length* – longest length between needed and thru-lane backup.

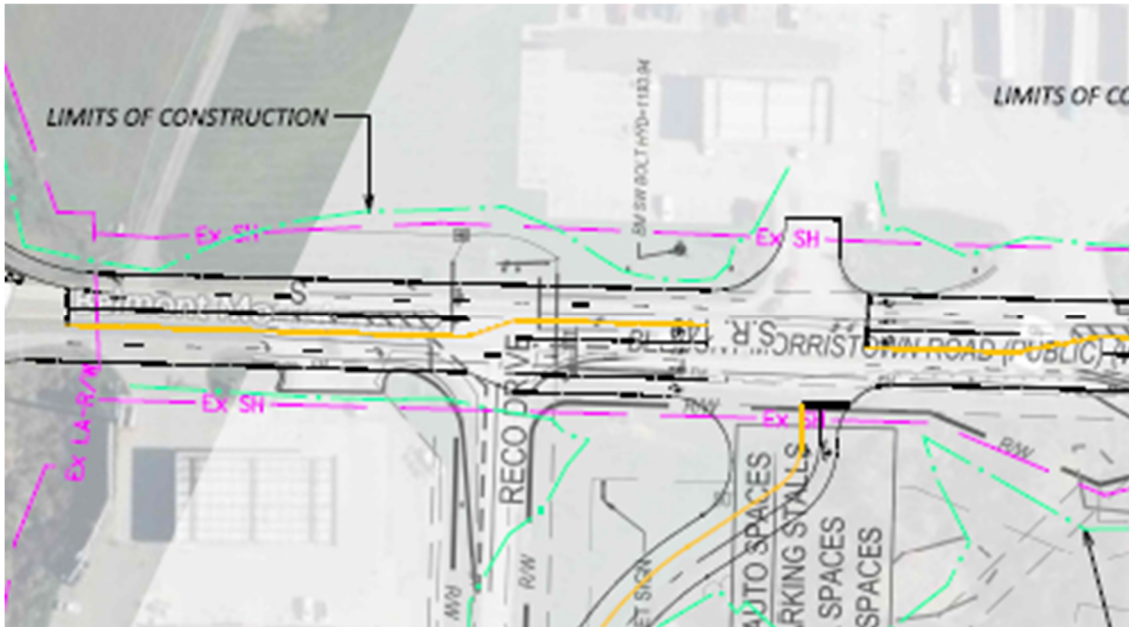
The table above shows the required storage length which is based upon the cycle length and design hourly volume. The proposed storage length is the higher value between the required storage length and the through lane back-up.

The available storage length is based upon the distance between the existing intersections and the proposed lane layouts. As you can see in the table above the available storage length is greater than the required storage lengths, except for the southbound left and right turn lanes at the Reco Drive intersection. The Reco Drive has been moved farther south than originally proposed to allow for longer turn lanes but is still restricted due to spacing requirements.

***Build at Ramps: Added Left Turn Lane WB Exit Ramp, Added SB & NB Left Turn Lane between Ramps, Added SB Lane and Continuous Right Turn onto EB Entrance Ramp***



**Build from EB Ramps to South of Relocated Reco Dr.: Added NB & SB Thru Lane, Added SB & NB Left Turn Lane at Reco Dr. and Added SB Rt. Lane at Reco Dr. between Ramps**



**Build South of Relocated Reco Dr. to South of Proposed Truck Entrance: Added NB & SB and Convert Outside SB Thru Lane to Right Turn Lane**





## Conclusion

The IOS verifies that under the build condition the level of service is D or better for all design year movements, except an E for EB at the truck drive. The study meets the requirements of the Ohio Department of Transportation.

# APPENDIX

## A. 2045 No Build

Freeway & Ramp TransModeler Outputs

Intersection TransModeler Outputs

Intersection Queue Length Outputs

## B. 2045 Build

Intersection TransModeler Outputs

Intersection Queue Length Outputs

## C. Turn Lane Length Calculations

## **A.2045 No Build**

**Freeway & Ramp TransModeler Outputs**

**Intersection TransModeler Outputs**

**Intersection Queue Length Outputs**

# Freeway Segment LOS - Density

Project: IR70 at SR149\_No Build  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

## I-70 EB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720522070	NEB	Basic	To SR 149	13.6	0.2	13.4	14.0	10
720514791	NEB	Diverge	To SR 149	12.2	0.3	11.7	12.8	10
720514744	NEB	Basic	Between RAMP I-70 EB TO SR 149 and RAMP SR 149 TO I-70 EB	11.5	0.2	11.2	11.8	10
720514745	EB	Merge	From SR 149	15.2	0.4	14.4	15.7	10
720514747	EB	Basic	From SR 149	16.5	0.4	15.4	16.8	10

## I-70 WB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720514751	SWB	Basic	To SR 149	70.6	12.8	49.9	91.9	10
720514753	SWB	Diverge	To SR 149	76.3	8.5	61.8	94.1	10
720514758	SWB	Basic	Between RAMP I-70 WB TO SR 149 and RAMP SR 149 TO I-70 WB	8.4	0.7	7.0	9.3	10
720514787	WB	Merge	From SR 149	8.4	0.5	7.5	8.9	10
720514789	WB	Basic	From SR 149	9.0	0.5	8.1	9.6	10

# Freeway Segment LOS - Density

Project: IR70 at SR149\_No Build  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

## I-70 EB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720522070	NEB	Basic	To SR 149	15.7	0.1	15.5	15.8	10
720514791	NEB	Diverge	To SR 149	14.0	0.5	13.3	14.9	10
720514744	NEB	Basic	Between RAMP I-70 EB TO SR 149 and RAMP SR 149 TO I-70 EB	13.6	0.2	13.3	13.8	10
720514745	EB	Merge	From SR 149	16.6	0.4	16.1	17.3	10
720514747	EB	Basic	From SR 149	17.3	0.2	16.8	17.5	10

## I-70 WB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720514751	SWB	Basic	To SR 149	19.2	1.0	18.6	21.6	10
720514753	SWB	Diverge	To SR 149	34.0	14.3	17.3	52.9	10
720514758	SWB	Basic	Between RAMP I-70 WB TO SR 149 and RAMP SR 149 TO I-70 WB	14.8	0.4	13.8	15.4	10
720514787	WB	Merge	From SR 149	14.3	0.3	13.8	14.7	10
720514789	WB	Basic	From SR 149	15.8	0.2	15.4	16.1	10

# Freeway Segment LOS - Density

Project: IR70 at SR149\_No Build  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

## I-70 EB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720522070	NEB	Basic	To SR 149	30.3	21.1	17.8	81.6	10
720514791	NEB	Diverge	To SR 149	43.1	18.9	16.6	77.3	10
720514744	NEB	Basic	Between RAMP I-70 EB TO SR 149 and RAMP SR 149 TO I-70 EB	15.7	1.6	12.6	17.4	10
720514745	EB	Merge	From SR 149	18.2	2.7	11.1	20.4	10
720514747	EB	Basic	From SR 149	17.4	1.8	13.6	18.8	10

## I-70 WB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720514751	SWB	Basic	To SR 149	107.9	6.9	97.5	118.1	10
720514753	SWB	Diverge	To SR 149	94.6	7.1	86.2	110.5	10
720514758	SWB	Basic	Between RAMP I-70 WB TO SR 149 and RAMP SR 149 TO I-70 WB	10.3	1.5	6.6	11.8	10
720514787	WB	Merge	From SR 149	9.2	1.3	6.3	10.9	10
720514789	WB	Basic	From SR 149	10.5	1.5	6.5	11.7	10

Project: IR70 at SR149\_No Build  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Total Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	0.5	0.3	0.3	1.3	10
NWB	SR 149	720495892	0.6	0.0	0.5	0.7	10
SEB	SR 149	720499681	1.3	1.1	0.5	3.8	10
WB	BOND DR	720499685	0.6	0.4	0.3	1.4	10

## SR 149 & RECO DR

**NODE: 104**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	3.5	0.6	2.6	4.2	10
NB	SR 149	720499693	54.8	19.6	25.4	78.2	10
SB	SR 149	720499689	2.2	0.4	1.7	2.7	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	2.8	1.6	1.6	7.1	10
NB	SR 149	720499689	8.1	0.5	7.0	8.7	10
SB	SR 149	720496045	7.2	0.6	6.2	8.0	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	5.9	0.8	4.9	7.5	10
SEB	SR 149	720495892	7.5	2.7	4.5	12.8	10
WB	RAMP I-70 WB TO SR 149	720496067	25.1	2.2	22.3	29.1	10

Project: IR70 at SR149\_No Build  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Avg Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	30.8	17.6	15.7	78.0	10
NWB	SR 149	720495892	4.8	0.5	4.3	5.9	10
SEB	SR 149	720499681	11.5	9.7	4.1	33.7	10
WB	BOND DR	720499685	55.0	32.1	29.0	127.2	10

## SR 149 & RECO DR

**NODE: 104**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	46.2	7.8	33.8	55.5	10
NB	SR 149	720499693	276.6	113.2	113.6	435.1	10
SB	SR 149	720499689	15.5	2.5	12.1	18.9	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	43.7	25.6	24.8	112.1	10
NB	SR 149	720499689	34.7	3.7	29.7	41.1	10
SB	SR 149	720496045	52.4	6.2	44.0	61.2	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	45.6	7.8	37.3	61.7	10
SEB	SR 149	720495892	68.6	24.8	41.1	116.0	10
WB	RAMP I-70 WB TO SR 149	720496067	319.5	54.1	243.4	421.0	10



Project: IR70 at SR149\_No Build  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Total Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	0.4	0.1	0.3	0.5	10
NWB	SR 149	720495892	0.2	0.1	0.1	0.4	10
SEB	SR 149	720499681	0.3	0.2	0.1	0.7	10
WB	BOND DR	720499685	0.3	0.1	0.2	0.3	10

## SR 149 & RECO DR

**NODE: 104**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	2.5	0.3	2.1	3.2	10
NB	SR 149	720499693	4.2	1.3	2.7	6.3	10
SB	SR 149	720499689	2.5	0.4	2.1	3.1	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	2.7	0.6	2.0	3.7	10
NB	SR 149	720499689	7.2	0.4	6.7	7.9	10
SB	SR 149	720496045	4.2	0.8	3.2	5.6	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	2.1	0.3	1.8	2.6	10
SEB	SR 149	720495892	4.5	1.9	2.5	9.2	10
WB	RAMP I-70 WB TO SR 149	720496067	20.0	1.7	15.9	21.8	10

Project: IR70 at SR149\_No Build  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Avg Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	20.5	3.9	14.8	27.4	10
NWB	SR 149	720495892	1.9	1.1	1.2	4.9	10
SEB	SR 149	720499681	4.4	2.9	1.8	10.1	10
WB	BOND DR	720499685	31.4	6.9	19.2	41.9	10

## SR 149 & RECO DR

**NODE: 104**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	37.5	4.8	31.7	47.6	10
NB	SR 149	720499693	28.8	8.8	18.5	42.9	10
SB	SR 149	720499689	13.8	2.2	11.3	17.2	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	47.1	11.6	34.1	65.1	10
NB	SR 149	720499689	40.3	2.3	37.4	44.6	10
SB	SR 149	720496045	25.3	4.9	18.8	33.6	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	21.8	2.3	18.2	25.8	10
SEB	SR 149	720495892	56.2	23.1	30.7	112.7	10
WB	RAMP I-70 WB TO SR 149	720496067	138.0	13.6	105.7	155.6	10

Project: IR70 at SR149\_No Build  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Total Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	2.2	2.5	0.1	8.8	10
NWB	SR 149	720495892	0.2	0.1	0.0	0.3	10
SEB	SR 149	720499681	8.6	5.2	3.8	19.5	10
WB	BOND DR	720499685	2.4	3.2	0.2	10.2	10

## SR 149 & RECO DR

**NODE: 104**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	3.5	1.5	2.0	6.6	10
NB	SR 149	720499693	26.5	17.3	3.6	61.0	10
SB	SR 149	720499689	2.4	0.7	0.7	3.2	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	16.9	5.4	3.0	21.9	10
NB	SR 149	720499689	8.7	2.2	2.5	9.8	10
SB	SR 149	720496045	5.8	1.5	1.7	6.9	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	8.1	2.1	2.3	9.2	10
SEB	SR 149	720495892	14.3	3.2	5.6	16.0	10
WB	RAMP I-70 WB TO SR 149	720496067	26.4	7.9	4.2	30.7	10

Project: IR70 at SR149\_No Build  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Avg Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	264.0	287.7	25.6	989.7	10
NWB	SR 149	720495892	2.6	0.6	1.6	3.9	10
SEB	SR 149	720499681	92.1	49.2	42.8	184.4	10
WB	BOND DR	720499685	231.1	253.2	43.5	733.8	10

## SR 149 & RECO DR

**NODE: 104**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	107.3	123.1	44.4	451.1	10
NB	SR 149	720499693	178.2	114.0	79.2	422.9	10
SB	SR 149	720499689	13.8	2.7	10.3	19.2	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	283.2	112.6	80.6	522.2	10
NB	SR 149	720499689	53.5	2.2	49.6	57.1	10
SB	SR 149	720496045	38.0	4.4	30.9	43.6	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	92.3	6.9	82.6	107.0	10
SEB	SR 149	720495892	152.4	25.9	119.2	214.7	10
WB	RAMP I-70 WB TO SR 149	720496067	247.3	41.1	137.4	284.0	10

Project: IR70 at SR149\_No Build  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

## Lane Queue by Intersection - Percentile Queue

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB L	33594836	BOND DR	60.2	26.6	17.2	110.2	10
EB L	33594838	BOND DR	43.8	22.3	16.5	66.4	10
EB TR	33594839	BOND DR	47.3	47.1	12.9	173.8	10
WB TR	33594845	BOND DR	11.0	3.1	8.6	19.5	10

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB L	33594824	SR 149	9.4	5.1	0.0	15.7	10
NWB L	33594847	SR 149	0.0	0.1	0.0	0.4	10
NWB T	33594848	SR 149	58.6	16.2	27.6	92.7	10
NWB R	33594849	SR 149	1.5	3.6	0.0	11.5	10
SEB T	33594853	SR 149	88.1	101.4	3.2	315.2	10
SEB R	33594854	SR 149	0.0	0.0	0.0	0.0	10

### SR 149 & RECO DR

NODE: 104

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LR	33594831	RECO DR	265.7	70.0	162.4	379.3	10

### SR 149 & RECO DR

NODE: 104

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594857	SR 149	1,065.3	730.5	483.5	2,486.9	10
NB T	33594858	SR 149	270.4	116.9	105.0	485.8	10
SB T	33594865	SR 149	255.6	13.1	231.4	271.2	10
SB R	33594876	SR 149	4.9	7.7	0.0	18.0	10
NB L	33594877	SR 149	16.7	1.3	15.0	19.4	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LT	33594855	RAMP I-70 EB TO SR 149	109.8	72.2	44.4	292.7	10
EB R	33594856	RAMP I-70 EB TO SR 149	179.7	115.0	96.1	493.8	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

Lane Queue by Intersection - Summary

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594870	SR 149	257.2	1.5	254.1	260.3	10
SB LT	33594883	SR 149	410.0	9.4	388.7	416.8	10
NB R	33594908	SR 149	252.1	3.7	247.4	256.3	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB**

**NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LT	33594828	RAMP I-70 WB TO SR 149	1,128.8	6.8	1,121.6	1,143.5	10
WB R	33594829	RAMP I-70 WB TO SR 149	83.3	21.0	48.2	124.4	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB**

**NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB TR	33577633	SR 149	500.5	127.4	330.2	613.5	10
NWB LT	33594880	SR 149	409.0	19.5	359.9	429.3	10

Project: IR70 at SR149\_No Build  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

## Lane Queue by Intersection - Percentile Queue

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB L	33594836	BOND DR	16.5	0.7	15.2	17.4	10
EB L	33594838	BOND DR	37.2	22.7	16.0	72.5	10
EB TR	33594839	BOND DR	29.6	17.9	11.7	63.8	10
WB TR	33594845	BOND DR	11.8	5.3	0.9	21.0	10

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB L	33594824	SR 149	0.0	0.0	0.0	0.0	10
NWB L	33594847	SR 149	0.0	0.0	0.0	0.0	10
NWB T	33594848	SR 149	2.8	4.4	0.0	10.7	10
NWB R	33594849	SR 149	0.0	0.0	0.0	0.0	10
SEB T	33594853	SR 149	3.8	7.7	0.0	24.9	10
SEB R	33594854	SR 149	0.0	0.0	0.0	0.0	10

### SR 149 & RECO DR

NODE: 104

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LR	33594831	RECO DR	161.1	38.6	130.0	267.5	10

### SR 149 & RECO DR

NODE: 104

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594857	SR 149	253.9	111.3	89.9	391.5	10
NB T	33594858	SR 149	132.9	63.2	50.5	251.1	10
SB T	33594865	SR 149	254.8	7.8	240.4	264.3	10
SB R	33594876	SR 149	0.0	0.1	0.0	0.4	10
NB L	33594877	SR 149	48.5	3.1	43.4	54.6	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LT	33594855	RAMP I-70 EB TO SR 149	79.0	9.0	64.2	92.3	10
EB R	33594856	RAMP I-70 EB TO SR 149	275.3	96.6	179.2	501.7	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

Lane Queue by Intersection - Summary

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594870	SR 149	258.4	6.8	250.1	274.4	10
SB LT	33594883	SR 149	306.4	40.3	264.1	379.9	10
NB R	33594908	SR 149	253.6	5.1	244.4	257.6	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB**

**NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LT	33594828	RAMP I-70 WB TO SR 149	1,097.3	68.0	904.3	1,124.9	10
WB R	33594829	RAMP I-70 WB TO SR 149	76.4	19.7	47.6	104.3	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB**

**NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB TR	33577633	SR 149	374.5	138.3	198.1	612.2	10
NWB LT	33594880	SR 149	193.2	32.6	144.9	256.4	10



Project: IR70 at SR149\_No Build  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

## Lane Queue by Intersection - Percentile Queue

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB L	33594836	BOND DR	760.5	173.2	523.1	997.0	10
EB L	33594838	BOND DR	13.3	6.7	0.0	17.6	10
EB TR	33594839	BOND DR	572.7	372.4	228.1	1,237.8	10
WB TR	33594845	BOND DR	16.0	15.9	0.0	52.7	10

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB L	33594824	SR 149	0.0	0.0	0.0	0.0	10
NWB L	33594847	SR 149	4.7	3.6	0.0	10.5	10
NWB T	33594848	SR 149	3.6	11.0	0.0	34.9	10
NWB R	33594849	SR 149	0.0	0.0	0.0	0.0	10
SEB T	33594853	SR 149	758.4	604.4	248.2	2,261.3	10
SEB R	33594854	SR 149	0.0	0.0	0.0	0.0	10

### SR 149 & RECO DR

NODE: 104

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LR	33594831	RECO DR	402.5	655.6	127.3	2,257.5	10

### SR 149 & RECO DR

NODE: 104

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594857	SR 149	1,408.2	847.1	538.4	2,786.5	10
NB T	33594858	SR 149	365.7	186.3	35.9	639.6	10
SB T	33594865	SR 149	258.4	23.6	194.8	283.4	10
SB R	33594876	SR 149	0.0	0.0	0.0	0.0	10
NB L	33594877	SR 149	55.8	17.1	16.7	71.1	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LT	33594855	RAMP I-70 EB TO SR 149	298.8	395.2	74.6	1,382.2	10
EB R	33594856	RAMP I-70 EB TO SR 149	1,295.8	281.2	529.7	1,427.8	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

Lane Queue by Intersection - Summary

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594870	SR 149	265.5	5.9	256.7	273.0	10
SB LT	33594883	SR 149	420.7	16.1	406.3	460.2	10
NB R	33594908	SR 149	258.5	5.9	245.3	267.2	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB**

**NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LT	33594828	RAMP I-70 WB TO SR 149	1,133.8	12.5	1,121.4	1,153.2	10
WB R	33594829	RAMP I-70 WB TO SR 149	51.5	20.7	0.0	70.5	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB**

**NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB TR	33577633	SR 149	617.2	6.5	613.3	634.8	10
NWB LT	33594880	SR 149	425.8	15.9	416.7	464.3	10

## **B.2045 Build**

**Freeway & Ramp TransModeler Outputs**

**Intersection TransModeler Outputs**

**Intersection Queue Length Outputs**

# Freeway Segment LOS - Density

Project: IR70 at SR149\_Signalized  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

## I-70 EB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720522070	NEB	Basic	To SR 149	13.6	0.1	13.4	13.8	10
720514791	NEB	Diverge	To SR 149	12.3	0.4	11.6	13.0	10
720514744	NEB	Basic	Between RAMP I-70 EB TO SR 149 and RAMP SR 149 TO I-70 EB	11.7	0.3	11.3	12.1	10
720514745	EB	Merge	From SR 149	16.3	0.8	14.9	17.3	10
720514747	EB	Basic	From SR 149	17.3	0.4	16.7	18.1	10

## I-70 WB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720514751	SWB	Basic	To SR 149	13.2	0.2	12.9	13.4	10
720514753	SWB	Diverge	To SR 149	11.8	0.6	10.8	13.0	10
720514758	SWB	Basic	Between RAMP I-70 WB TO SR 149 and RAMP SR 149 TO I-70 WB	9.3	0.4	8.6	9.9	10
720514787	WB	Merge	From SR 149	10.4	0.5	9.5	11.0	10
720514789	WB	Basic	From SR 149	11.6	0.2	11.1	11.9	10

# Freeway Segment LOS - Density

Project: IR70 at SR149\_Signalized  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

## I-70 EB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720522070	NEB	Basic	To SR 149	15.7	0.1	15.6	16.0	10
720514791	NEB	Diverge	To SR 149	14.2	0.4	13.6	15.0	10
720514744	NEB	Basic	Between RAMP I-70 EB TO SR 149 and RAMP SR 149 TO I-70 EB	13.4	0.3	12.8	13.8	10
720514745	EB	Merge	From SR 149	16.8	0.6	15.7	17.3	10
720514747	EB	Basic	From SR 149	17.4	0.3	17.0	18.1	10

## I-70 WB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720514751	SWB	Basic	To SR 149	18.7	0.2	18.3	18.9	10
720514753	SWB	Diverge	To SR 149	17.2	0.6	16.3	18.0	10
720514758	SWB	Basic	Between RAMP I-70 WB TO SR 149 and RAMP SR 149 TO I-70 WB	13.9	0.3	13.4	14.3	10
720514787	WB	Merge	From SR 149	13.6	0.7	12.8	15.0	10
720514789	WB	Basic	From SR 149	16.2	0.2	15.9	16.5	10

# Freeway Segment LOS - Density

Project: IR70 at SR149\_Signalized  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

## I-70 EB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720522070	NEB	Basic	To SR 149	18.1	0.1	17.8	18.3	10
720514791	NEB	Diverge	To SR 149	16.3	0.6	15.1	16.9	10
720514744	NEB	Basic	Between RAMP I-70 EB TO SR 149 and RAMP SR 149 TO I-70 EB	15.0	0.2	14.7	15.4	10
720514745	EB	Merge	From SR 149	18.6	0.6	17.5	19.4	10
720514747	EB	Basic	From SR 149	20.3	0.2	20.0	20.8	10

## I-70 WB

Segment ID	Direction	Analysis Type	Location	Average	Std Dev	Minimum	Maximum	# Samples
720514751	SWB	Basic	To SR 149	19.6	0.2	19.4	20.1	10
720514753	SWB	Diverge	To SR 149	18.2	0.5	17.2	18.8	10
720514758	SWB	Basic	Between RAMP I-70 WB TO SR 149 and RAMP SR 149 TO I-70 WB	13.5	0.3	12.9	13.9	10
720514787	WB	Merge	From SR 149	14.0	0.7	13.0	15.0	10
720514789	WB	Basic	From SR 149	16.6	0.4	15.9	17.2	10

Project: IR70 at SR149\_Signalized  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Total Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	0.3	0.1	0.3	0.4	10
NWB	SR 149	720495892	0.2	0.0	0.2	0.2	10
SEB	SR 149	720499681	0.5	0.1	0.4	0.6	10
WB	BOND DR	720499685	0.4	0.1	0.3	0.5	10

## SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

**NODE: 107**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NB	SR 149	720499680	3.1	0.2	2.7	3.4	10
NEB	Loves Truck Access	720499698	1.3	0.2	1.0	1.6	10
SB	SR 149	720499695	1.0	0.1	0.9	1.2	10
WB	Pilot South Access	720499697	0.3	0.0	0.2	0.3	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	0.8	0.1	0.6	0.9	10
NB	SR 149	720499689	1.1	0.1	1.0	1.2	10
SEB	SR 149	720496045	1.8	0.1	1.6	1.9	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	1.5	0.1	1.3	1.6	10
SEB	SR 149	720495892	1.8	0.1	1.7	2.0	10
WB	RAMP I-70 WB TO SR 149	720496067	2.9	0.1	2.7	3.0	10

## SR 149, RECO DR & PILOT NORTH ACCESS

**NODE: 105**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	1.4	0.1	1.3	1.5	10
NB	SR 149	720499695	3.0	0.2	2.8	3.4	10
SB	SR 149	720499689	1.8	0.1	1.6	2.0	10
WB	Pilot North Access	720499696	0.4	0.1	0.3	0.5	10

Project: IR70 at SR149\_Signalized  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Avg Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	21.1	2.3	16.0	24.5	10
NWB	SR 149	720495892	1.3	0.1	1.0	1.5	10
SEB	SR 149	720499681	4.4	0.6	3.8	5.4	10
WB	BOND DR	720499685	32.8	4.7	24.5	39.8	10

## SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

**NODE: 107**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NB	SR 149	720499680	13.9	0.9	12.3	15.3	10
NEB	Loves Truck Access	720499698	70.9	10.6	59.4	86.5	10
SB	SR 149	720499695	8.4	0.6	7.6	9.6	10
WB	Pilot South Access	720499697	17.9	2.5	13.6	21.1	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	12.8	1.3	10.0	14.4	10
NB	SR 149	720499689	4.0	0.2	3.7	4.3	10
SEB	SR 149	720496045	10.5	0.5	9.7	11.3	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	9.6	0.6	8.7	10.3	10
SEB	SR 149	720495892	16.1	1.1	15.0	18.0	10
WB	RAMP I-70 WB TO SR 149	720496067	22.3	0.8	21.1	23.4	10

## SR 149, RECO DR & PILOT NORTH ACCESS

**NODE: 105**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	18.2	0.7	16.9	19.3	10
NB	SR 149	720499695	12.8	0.8	11.9	14.3	10
SB	SR 149	720499689	10.7	0.7	9.5	12.1	10
WB	Pilot North Access	720499696	20.6	1.7	18.5	23.3	10



Project: IR70 at SR149\_Signalized  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Total Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	0.4	0.1	0.3	0.5	10
NWB	SR 149	720495892	0.1	0.0	0.1	0.2	10
SEB	SR 149	720499681	0.2	0.0	0.1	0.2	10
WB	BOND DR	720499685	0.3	0.0	0.2	0.3	10

## SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

**NODE: 107**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NB	SR 149	720499680	1.4	0.1	1.2	1.6	10
NEB	Loves Truck Access	720499698	0.3	0.0	0.3	0.4	10
SB	SR 149	720499695	0.8	0.1	0.7	1.0	10
WB	Pilot South Access	720499697	0.4	0.1	0.3	0.5	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	0.8	0.1	0.7	0.9	10
NB	SR 149	720499689	1.1	0.0	1.0	1.1	10
SEB	SR 149	720496045	0.7	0.1	0.6	0.9	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	1.3	0.1	1.1	1.4	10
SEB	SR 149	720495892	1.2	0.1	1.0	1.3	10
WB	RAMP I-70 WB TO SR 149	720496067	4.6	0.1	4.3	4.7	10

## SR 149, RECO DR & PILOT NORTH ACCESS

**NODE: 105**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	1.8	0.1	1.5	2.0	10
NB	SR 149	720499695	1.7	0.2	1.4	1.8	10
SB	SR 149	720499689	2.5	0.3	2.1	2.8	10
WB	Pilot North Access	720499696	0.5	0.1	0.3	0.6	10

Project: IR70 at SR149\_Signalized  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Avg Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	23.7	3.4	16.8	28.7	10
NWB	SR 149	720495892	1.4	0.2	1.0	1.7	10
SEB	SR 149	720499681	2.6	0.5	1.6	3.3	10
WB	BOND DR	720499685	33.7	3.5	28.4	40.0	10

## SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

**NODE: 107**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NB	SR 149	720499680	12.3	1.1	10.5	13.7	10
NEB	Loves Truck Access	720499698	36.8	3.2	32.7	42.2	10
SB	SR 149	720499695	5.5	0.5	5.0	6.3	10
WB	Pilot South Access	720499697	15.8	2.4	12.3	20.6	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	14.0	1.1	12.4	15.9	10
NB	SR 149	720499689	6.0	0.1	5.8	6.2	10
SEB	SR 149	720496045	4.2	0.5	3.5	5.0	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	12.7	1.0	11.3	14.2	10
SEB	SR 149	720495892	14.5	1.1	12.3	16.1	10
WB	RAMP I-70 WB TO SR 149	720496067	29.3	0.9	27.5	30.2	10

## SR 149, RECO DR & PILOT NORTH ACCESS

**NODE: 105**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	26.3	1.9	22.7	29.6	10
NB	SR 149	720499695	11.9	0.9	10.5	13.1	10
SB	SR 149	720499689	13.1	1.3	11.1	14.8	10
WB	Pilot North Access	720499696	25.4	5.4	18.2	32.3	10

Project: IR70 at SR149\_Signalized  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Total Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	0.4	0.1	0.3	0.5	10
NWB	SR 149	720495892	0.4	0.1	0.3	0.5	10
SEB	SR 149	720499681	0.3	0.0	0.3	0.4	10
WB	BOND DR	720499685	0.7	0.1	0.5	0.9	10

## SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

**NODE: 107**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NB	SR 149	720499680	3.0	0.3	2.4	3.5	10
NEB	Loves Truck Access	720499698	2.2	0.4	1.5	3.0	10
SB	SR 149	720499695	0.7	0.1	0.5	0.8	10
WB	Pilot South Access	720499697	0.4	0.1	0.3	0.5	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	1.5	0.1	1.3	1.7	10
NB	SR 149	720499689	1.8	0.2	1.6	2.1	10
SEB	SR 149	720496045	1.7	1.9	0.7	6.4	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	3.4	0.4	3.1	4.1	10
SEB	SR 149	720495892	3.3	0.2	3.1	3.6	10
WB	RAMP I-70 WB TO SR 149	720496067	5.9	0.1	5.7	6.1	10

## SR 149, RECO DR & PILOT NORTH ACCESS

**NODE: 105**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	1.4	0.1	1.3	1.6	10
NB	SR 149	720499695	2.4	0.2	2.2	2.8	10
SB	SR 149	720499689	4.3	0.3	3.8	4.8	10
WB	Pilot North Access	720499696	0.5	0.1	0.4	0.7	10

Project: IR70 at SR149\_Signalized  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

# Intersection LOS by Approach - Avg Control Delay

## SR 149 & BOND DR

**NODE: 101**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	BOND DR	720499684	30.7	6.7	23.9	42.9	10
NWB	SR 149	720495892	3.4	0.3	2.8	4.0	10
SEB	SR 149	720499681	3.0	0.3	2.5	3.4	10
WB	BOND DR	720499685	41.4	4.8	34.3	52.1	10

## SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

**NODE: 107**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NB	SR 149	720499680	21.2	2.1	17.7	24.9	10
NEB	Loves Truck Access	720499698	77.9	14.2	53.6	105.3	10
SB	SR 149	720499695	3.1	0.3	2.3	3.4	10
WB	Pilot South Access	720499697	15.5	3.0	10.9	21.1	10

## SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

**NODE: 103**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RAMP I-70 EB TO SR 149	720496046	20.1	1.9	17.4	23.3	10
NB	SR 149	720499689	8.7	0.6	7.6	9.7	10
SEB	SR 149	720496045	7.1	7.9	3.1	26.6	10

## SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB

**NODE: 102**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
NWB	SR 149	720496045	29.4	3.2	26.5	35.8	10
SEB	SR 149	720495892	27.9	1.4	25.6	30.4	10
WB	RAMP I-70 WB TO SR 149	720496067	30.4	0.6	29.6	31.4	10

## SR 149, RECO DR & PILOT NORTH ACCESS

**NODE: 105**

Direction	Street Name	Superlink ID	Average	Std Dev	Minimum	Maximum	# Samples
EB	RECO DR	720499683	32.0	2.0	28.4	34.4	10
NB	SR 149	720499695	13.3	0.9	12.3	15.3	10
SB	SR 149	720499689	16.6	1.0	14.7	18.6	10
WB	Pilot North Access	720499696	24.4	5.0	18.0	33.2	10

Project: IR70 at SR149\_Signalized  
 Scenario: AM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 07:00:00 - 08:00:00  
 Interval: Summary  
 Selection: --

## Lane Queue by Intersection - Avg Queue

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB L	33594836	BOND DR	5.6	1.7	4.0	9.8	10
EB L	33594838	BOND DR	3.9	1.7	2.1	7.7	10
EB TR	33594839	BOND DR	3.9	1.3	2.3	6.0	10
WB TR	33594845	BOND DR	2.6	0.9	1.4	3.9	10

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB L	33594824	SR 149	1.6	0.3	1.1	2.0	10
NWB L	33594847	SR 149	0.1	0.1	0.0	0.3	10
NWB T	33594848	SR 149	1.6	0.7	0.6	2.6	10
NWB R	33594849	SR 149	0.2	0.1	0.1	0.2	10
SEB T	33594853	SR 149	2.0	0.9	0.9	3.9	10
SEB R	33594854	SR 149	0.0	0.0	0.0	0.0	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NEB LTR	33594898	Loves Truck Access	84.1	16.4	61.6	110.5	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LTR	33594891	Pilot South Access	16.4	2.8	10.9	20.5	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SB L	33594878	SR 149	13.0	1.3	11.4	14.9	10
NB L	33594900	SR 149	8.5	2.3	4.8	11.5	10
NB TR	33594901	SR 149	42.4	5.6	30.3	48.9	10
SB T	33594907	SR 149	18.1	2.2	15.4	21.6	10
SB R	33594908	SR 149	0.2	0.4	0.0	1.2	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

## Lane Queue by Intersection - Summary

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LT	33594855	RAMP I-70 EB TO SR 149	7.3	1.4	5.7	10.3	10
EB R	33594856	RAMP I-70 EB TO SR 149	10.7	2.4	7.2	14.9	10

**SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB****NODE: 103**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594870	SR 149	4.3	0.9	2.7	5.4	10
NB R	33594874	SR 149	0.0	0.0	0.0	0.0	10
SEB T	33594884	SR 149	8.5	1.9	4.7	11.3	10
SEB T	33594917	SR 149	9.4	1.1	8.0	11.2	10
NB T	33594924	SR 149	14.0	1.9	11.5	16.6	10
SEB L	33594926	SR 149	13.3	1.7	11.1	15.8	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB****NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LT	33594828	RAMP I-70 WB TO SR 149	28.6	2.7	24.4	33.2	10
WB R	33594829	RAMP I-70 WB TO SR 149	7.5	1.8	4.6	11.1	10
WB L	33594913	RAMP I-70 WB TO SR 149	33.5	3.3	29.0	40.2	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB****NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB TR	33577633	SR 149	32.1	3.3	27.5	36.7	10
NWB T	33594886	SR 149	0.6	0.4	0.1	1.3	10
NWB L	33594948	SR 149	41.4	6.1	29.7	48.7	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LTR	33594889	Pilot North Access	8.2	1.5	6.2	10.5	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB L	33594918	RECO DR	24.0	2.3	20.4	27.4	10
EB TR	33594919	RECO DR	4.3	1.0	2.5	6.0	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SB T	33594865	SR 149	38.3	8.1	29.8	52.7	10
SB L	33594911	SR 149	4.8	1.2	2.9	6.5	10
SB T	33594912	SR 149	2.5	0.5	1.7	3.2	10
SB R	33594921	SR 149	0.7	0.3	0.3	1.1	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB L	33594937	SR 149	2.5	0.8	1.3	4.3	10
NB T	33594938	SR 149	39.1	6.0	30.8	51.2	10
NB TR	33594939	SR 149	26.9	3.1	22.6	31.5	10

Project: IR70 at SR149\_Signalized  
 Scenario: MID Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 12:45:00 - 13:45:00  
 Interval: Summary  
 Selection: --

# Lane Queue by Intersection

## - Avg Queue

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB L	33594836	BOND DR	2.0	0.8	1.1	3.6	10
EB L	33594838	BOND DR	5.9	1.9	4.2	10.6	10
EB TR	33594839	BOND DR	4.9	1.4	2.7	7.5	10
WB TR	33594845	BOND DR	1.8	0.6	1.0	2.8	10

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB L	33594824	SR 149	0.1	0.2	0.0	0.6	10
NWB L	33594847	SR 149	0.3	0.4	0.0	1.1	10
NWB T	33594848	SR 149	0.9	0.5	0.4	1.9	10
NWB R	33594849	SR 149	0.0	0.0	0.0	0.1	10
SEB T	33594853	SR 149	1.0	0.7	0.1	2.2	10
SEB R	33594854	SR 149	0.0	0.0	0.0	0.0	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NEB LTR	33594898	Loves Truck Access	20.2	3.8	15.6	29.0	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LTR	33594891	Pilot South Access	18.2	3.4	12.9	23.7	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SB L	33594878	SR 149	17.4	5.8	11.4	26.7	10
NB L	33594900	SR 149	0.0	0.0	0.0	0.0	10
NB TR	33594901	SR 149	25.3	4.3	19.8	33.2	10
SB T	33594907	SR 149	8.6	2.1	6.2	12.4	10
SB R	33594908	SR 149	0.2	0.3	0.0	0.6	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103



## Lane Queue by Intersection - Summary

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LT	33594855	RAMP I-70 EB TO SR 149	12.6	2.3	9.5	15.8	10
EB R	33594856	RAMP I-70 EB TO SR 149	9.2	2.2	6.8	13.0	10

**SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB****NODE: 103**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594870	SR 149	8.2	1.2	6.6	10.5	10
NB R	33594874	SR 149	0.0	0.0	0.0	0.0	10
SEB T	33594884	SR 149	3.2	1.6	1.2	5.9	10
SEB T	33594917	SR 149	2.6	1.1	0.9	4.1	10
NB T	33594924	SR 149	10.1	1.2	8.8	12.2	10
SEB L	33594926	SR 149	4.3	1.2	2.8	6.2	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB****NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LT	33594828	RAMP I-70 WB TO SR 149	50.7	5.3	44.2	61.7	10
WB R	33594829	RAMP I-70 WB TO SR 149	4.4	1.5	1.9	6.3	10
WB L	33594913	RAMP I-70 WB TO SR 149	58.9	7.1	48.7	69.1	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB****NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB TR	33577633	SR 149	26.2	3.4	20.9	30.5	10
NWB T	33594886	SR 149	3.7	1.1	1.8	5.5	10
NWB L	33594948	SR 149	29.2	4.3	23.8	36.5	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LTR	33594889	Pilot North Access	9.7	2.4	6.3	12.8	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB L	33594918	RECO DR	35.5	5.0	27.6	43.4	10
EB TR	33594919	RECO DR	3.1	0.7	1.9	4.3	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SB T	33594865	SR 149	43.9	7.8	30.4	55.3	10
SB L	33594911	SR 149	1.6	0.6	0.9	2.8	10
SB T	33594912	SR 149	5.7	1.9	2.5	9.0	10
SB R	33594921	SR 149	0.9	0.3	0.4	1.6	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB L	33594937	SR 149	1.4	0.3	1.1	2.0	10
NB T	33594938	SR 149	23.8	5.4	15.7	32.4	10
NB TR	33594939	SR 149	21.4	5.0	13.0	26.2	10

Project: IR70 at SR149\_Signalized  
 Scenario: PM Peak Hour  
 Run(s): Batch (10 runs)  
 Simulated: Various  
 Time: 16:15:00 - 17:15:00  
 Interval: Summary  
 Selection: --

# Lane Queue by Intersection

## - Avg Queue

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB L	33594836	BOND DR	9.9	1.9	6.1	13.0	10
EB L	33594838	BOND DR	1.8	0.5	1.2	2.7	10
EB TR	33594839	BOND DR	5.6	2.1	3.3	10.2	10
WB TR	33594845	BOND DR	1.7	0.6	0.7	2.5	10

### SR 149 & BOND DR

NODE: 101

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB L	33594824	SR 149	0.2	0.1	0.0	0.3	10
NWB L	33594847	SR 149	1.0	0.7	0.2	2.1	10
NWB T	33594848	SR 149	3.1	1.1	1.9	4.9	10
NWB R	33594849	SR 149	0.0	0.0	0.0	0.1	10
SEB T	33594853	SR 149	2.0	0.8	0.4	3.1	10
SEB R	33594854	SR 149	0.1	0.1	0.0	0.3	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NEB LTR	33594898	Loves Truck Access	150.6	37.2	95.0	219.8	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LTR	33594891	Pilot South Access	24.8	4.2	16.3	29.3	10

### SR 149, LOVES TRUCK ACCESS & PILOT SOUTH ACCESS

NODE: 107

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SB L	33594878	SR 149	14.4	2.1	10.8	18.0	10
NB L	33594900	SR 149	0.0	0.0	0.0	0.0	10
NB TR	33594901	SR 149	53.3	8.6	39.5	63.0	10
SB T	33594907	SR 149	2.9	1.2	1.6	5.7	10
SB R	33594908	SR 149	0.0	0.0	0.0	0.0	10

### SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB

NODE: 103

## Lane Queue by Intersection - Summary

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB LT	33594855	RAMP I-70 EB TO SR 149	12.5	1.8	9.8	15.8	10
EB R	33594856	RAMP I-70 EB TO SR 149	37.1	4.0	32.1	42.8	10

**SR 149, RAMP I-70 EB TO SR 149 & RAMP SR 149 TO I-70 EB****NODE: 103**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB T	33594870	SR 149	20.1	4.9	15.6	29.1	10
NB R	33594874	SR 149	0.0	0.0	0.0	0.0	10
SEB T	33594884	SR 149	2.6	1.6	0.5	6.1	10
SEB T	33594917	SR 149	2.4	1.4	0.6	5.2	10
NB T	33594924	SR 149	22.0	2.4	19.1	27.1	10
SEB L	33594926	SR 149	5.7	1.0	4.0	8.0	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB****NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LT	33594828	RAMP I-70 WB TO SR 149	62.0	4.4	54.3	66.8	10
WB R	33594829	RAMP I-70 WB TO SR 149	3.7	1.2	1.9	6.4	10
WB L	33594913	RAMP I-70 WB TO SR 149	75.2	5.3	65.9	86.3	10

**SR 149, RAMP I-70 WB TO SR 149 & RAMP SR 149 TO I-70 WB****NODE: 102**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SEB TR	33577633	SR 149	68.7	6.2	58.7	75.8	10
NWB T	33594886	SR 149	27.4	3.3	22.0	31.9	10
NWB L	33594948	SR 149	63.0	16.0	46.3	95.1	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
WB LTR	33594889	Pilot North Access	12.5	4.4	8.4	22.9	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
EB L	33594918	RECO DR	26.7	2.3	21.8	29.9	10
EB TR	33594919	RECO DR	3.6	0.8	2.6	4.9	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
SB T	33594865	SR 149	64.7	8.3	54.3	74.9	10
SB L	33594911	SR 149	1.9	1.0	0.9	3.8	10
SB T	33594912	SR 149	27.7	3.9	21.9	34.6	10
SB R	33594921	SR 149	0.7	0.2	0.5	1.0	10

**SR 149, RECO DR & PILOT NORTH ACCESS****NODE: 105**

Movements	Lane ID	Street Name	Average	Std Deviation	Minimum	Maximum	# Samples
NB L	33594937	SR 149	2.9	0.8	1.6	4.7	10
NB T	33594938	SR 149	29.5	4.4	22.5	35.7	10
NB TR	33594939	SR 149	33.4	6.8	23.2	46.0	10

## **C.Turn Lane Length Calculations**

## Turn Lane Length Worksheet

### Design Data

**Project ID:** BEL-70-9.35      **Date:** 26-Jun-24  
**E-W Road:** Bond Drive      **N-S Road:** SR 149  
**Analyst:** DLW      **Checked By:** J Hamilton  
**Analyzed Year:** 2047 BUILD

**Input Values:**

**Type of Traffic Control:** S

SIGNALIZED    OR     UNSIGNALIZED STOPPED CROSSROAD    OR     UNSIGNALIZED THROUGH ROAD

**AM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10	10	40	10	10	20	10	360	20	10	370	10

**MID Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10	10	10	10	10	40	20	300	20	10	240	10

**PM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10	10	20	10	10	40	10	380	170	10	340	60

**Intersection Geometry - Number of Lanes (Use 0 if Turn Lane is Shared, i.e., Not Exclusive)**

Eastbound		Westbound		Northbound		Southbound	
Left	1	Left	1	Left	1	Left	1
Through	1	Through	1	Through	1	Through	1
Right	0	Right	0	Right	1	Right	1
Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n
Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0

**Design Speed (mph)**

Eastbound	Westbound	Northbound	Southbound
25	35	45	45

**Cycle Length**

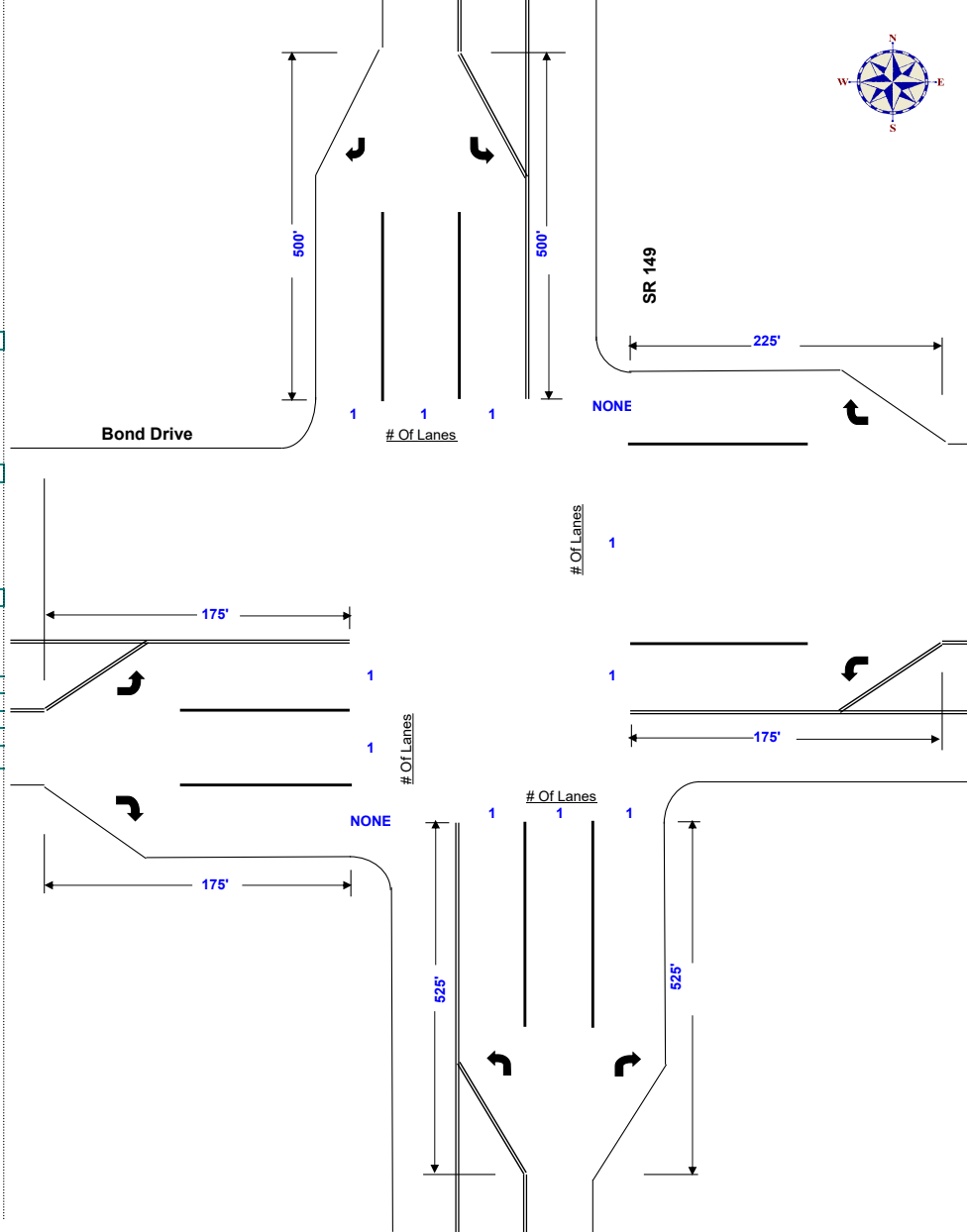
AM (sec)	90
MID (sec)	110
PM (sec)	120

**Analysis Results:**

Turn Lane Length and Through Storage (ft.)

<u>Eastbound</u>		<u>Westbound</u>	
Left	175	Left	175
Through	150	Through	150
Right	175	Right	225
<u>Northbound</u>		<u>Southbound</u>	
Left	525	Left	500
Through	525	Through	500
Right	525	Right	500

### Standard Layout (Not to scale)



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn

NBL

Calc. By: DLW

**AM**      **MID**      **PM**

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 10   20   10 vehicles

No. of turn lanes 1

Through Volume 360   300   380 vehicles

No. of through lanes 1

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle	1	1	1
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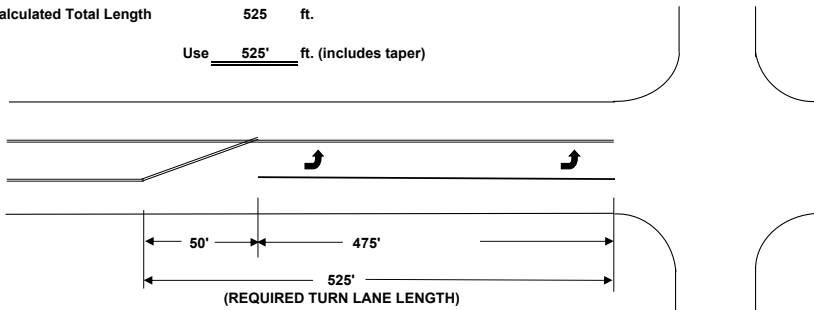
Calculated Turn Lane Length	125	125	125
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Turning Length/lane	125	125	125
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<b>Backup Check</b>			
Vehicles/cycle	9	10	13
Backup Length	350	375	475
Backup Length/lane	350	375	475

Calculated Total Length      **525**      ft.

Use 525' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 2.702703 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 6.25 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1                    50
- 2                    100
- 3                    150
- 4                    175
- 5                    200
- 6                    250



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn SBL

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 10 10 10 vehicles

No. of turn lanes 1

Through Volume 370 240 340 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

Calculated Turn Lane Length 125 125 125

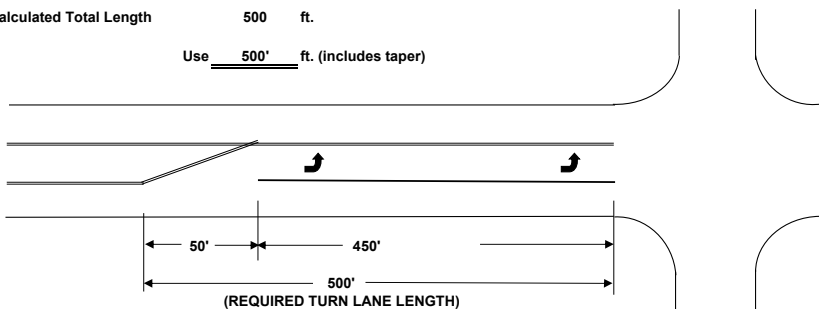
Turning Length/lane 125 125 125

Backup Check

Vehicles/cycle	10	8	12
Backup Length	375	325	450
Backup Length/lane	375	325	450

Calculated Total Length 500 ft.

Use 500' ft. (includes taper)



**CHARTS**

AM						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 AM % OF TRAFFIC TURNING A.M. 2.631579 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 PM % OF TRAFFIC TURNING P.M. 4 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175 USC= FALSE UTR= FALSE SPEED = 30-35 PM % OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn EBL

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 10 10 10 vehicles

No. of turn lanes 1

Through Volume 50 20 10 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

Calculated Turn Lane Length 125 125 125

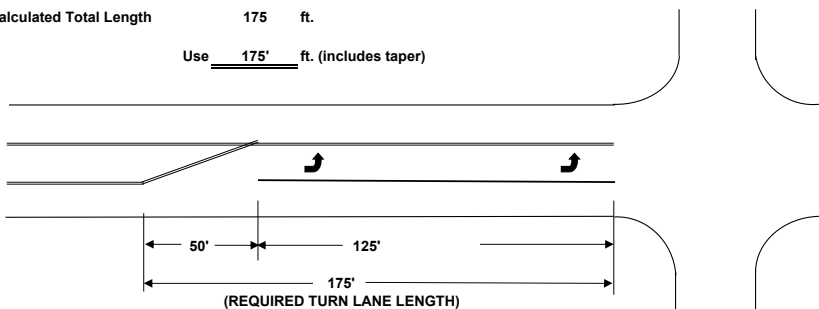
Turning Length/lane 125 125 125

Backup Check

Vehicles/cycle	2	1	1
Backup Length	100	50	50
Backup Length/lane	100	50	50

Calculated Total Length 175 ft.

Use 175' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 16.66667 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 33.33333 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn WBL

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 10 10 10 vehicles

No. of turn lanes 1

Through Volume 30 50 10 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

Calculated Turn Lane Length 125 125 125

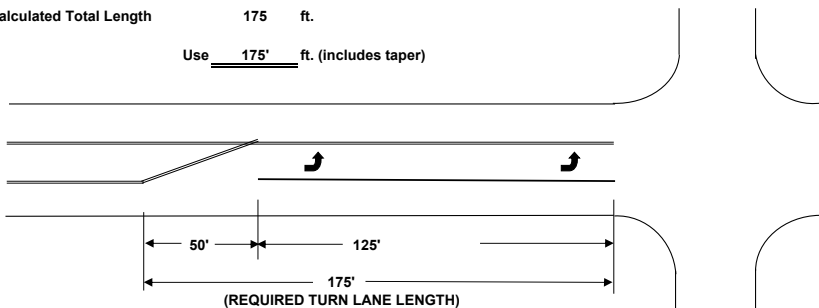
Turning Length/lane 125 125 125

Backup Check

Vehicles/cycle	1	2	1
Backup Length	50	100	50
Backup Length/lane	50	100	50

Calculated Total Length 175 ft.

Use 175' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
25 HIGH						
% OF TRAFFIC TURNING A.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
16.66667 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn

NBR

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 20 20 170 vehicles

No. of turn lanes 1

Through Volume 360 300 380 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 6

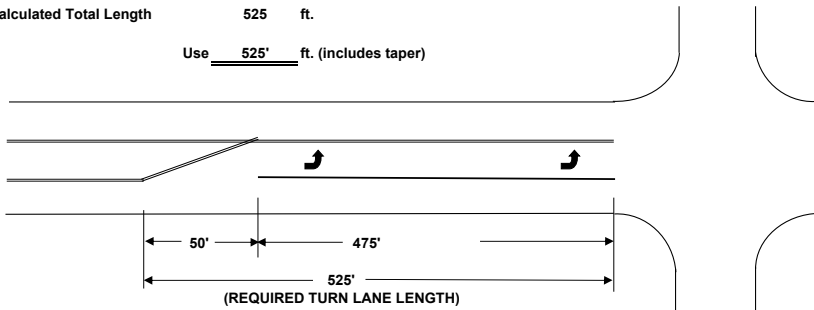
Calculated Turn Lane Length 125 125 125

Turning Length/lane 125 125 125

Backup Check  
Vehicles/cycle 9 10 13  
Backup Length 350 375 475  
Backup Length/lane 350 375 475

Calculated Total Length 525 ft.

Use 525' ft. (includes taper)



**CHARTS**

AM						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 AM % OF TRAFFIC TURNING A.M. 5.263158 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 PM % OF TRAFFIC TURNING P.M. 6.25 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175 USC= FALSE UTR= FALSE SPEED = 30-35 PM % OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	175	175	175	175
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn

SBR

Calc. By: DLW

AM    MID    PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 10    10    60 vehicles

No. of turn lanes 1

Through Volume 370    240    340 vehicles

No. of through lanes 1

Cycle length 90    110    120 secs.

Cycle per hour            40            33            30

Vehicles/cycle	1	1	2
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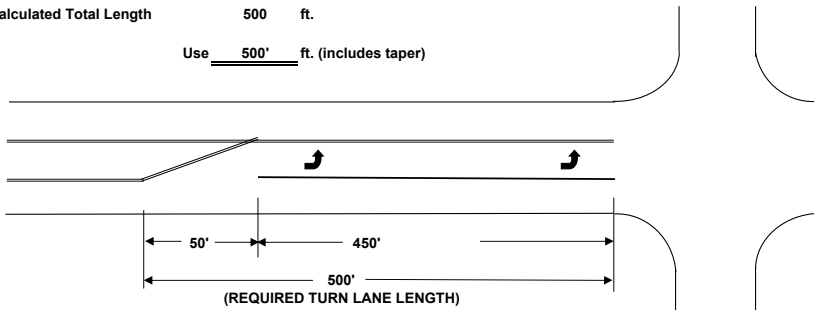
Calculated Turn Lane Length	125	125	125
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Turning Length/lane	125	125	125
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<b>Backup Check</b>			
Vehicles/cycle	10	8	12
Backup Length	375	325	450
Backup Length/lane	375	325	450

Calculated Total Length            **500** ft.

Use 500' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 2.631579 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 4 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	175	175	175	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

- A
- 1                    50
- 2                    100
- 3                    150
- 4                    175
- 5                    200
- 6                    250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn

EBR

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 40 10 20 vehicles

No. of turn lanes 1

Through Volume 10 10 10 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

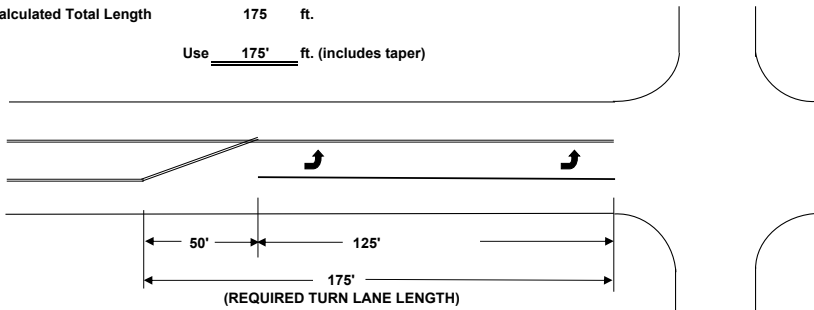
Calculated Turn Lane Length 125 125 125

Turning Length/lane 125 125 125

Backup Check  
Vehicles/cycle 1 1 1  
Backup Length 50 50 50  
Backup Length/lane 50 50 50

Calculated Total Length 175 ft.

Use 175' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
80 HIGH						
% OF TRAFFIC TURNING A.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
50 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

Bond Drive & SR 149  
2047 BUILD

Turn EBR

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 20 40 40 vehicles

No. of turn lanes 1

Through Volume 10 10 10 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 2 2

Calculated Turn Lane Length 125 175 175

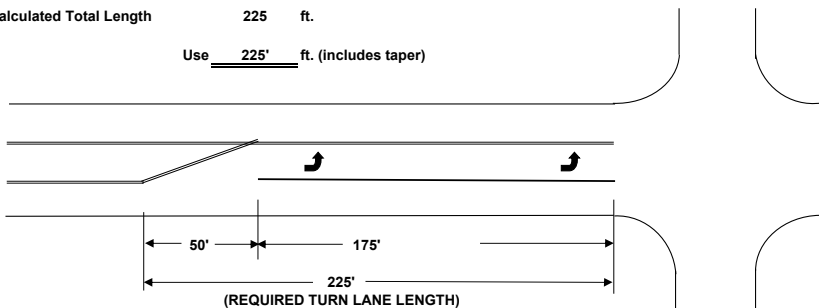
Turning Length/lane 125 175 175

Backup Check

Vehicles/cycle	1	1	1
Backup Length	50	50	50
Backup Length/lane	50	50	50

Calculated Total Length **225** ft.

Use 225' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 66.66667 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 80 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

PM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	211	211	211	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

A	
1	50
2	100
3	150
4	175
5	200
6	250

## Turn Lane Length Worksheet

### Design Data

**Project ID:** BEL-70-9.35      **Date:** 26-Jun-24  
**E-W Road:** I70 WB RAMP      **N-S Road:** SR 149  
**Analyst:** DLW      **Checked By:** J Hamilton  
**Analyzed Year:** 2047 BUILD

**Input Values:**

**Type of Traffic Control:** S

SIGNALIZED    OR     UNSIGNALIZED STOPPED CROSSROAD    OR     UNSIGNALIZED THROUGH ROAD

**AM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
0	0	0	520	10	180	190	230	0	0	350	80

**MID Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
0	0	0	400	10	160	180	180	0	0	230	60

**PM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
0	0	0	280	10	180	170	380	0	0	330	70

**Intersection Geometry - Number of Lanes (Use 0 if Turn Lane is Shared, i.e., Not Exclusive)**

Eastbound		Westbound		Northbound		Southbound	
Left	0	Left	2	Left	1	Left	0
Through	0	Through	0	Through	1	Through	1
Right	0	Right	1	Right	0	Right	0
Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n
Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0

**Design Speed (mph)**

Eastbound	Westbound	Northbound	Southbound
	30	45	45

**Cycle Length**

AM (sec)	90
MID (sec)	110
PM (sec)	120

**Analysis Results:**

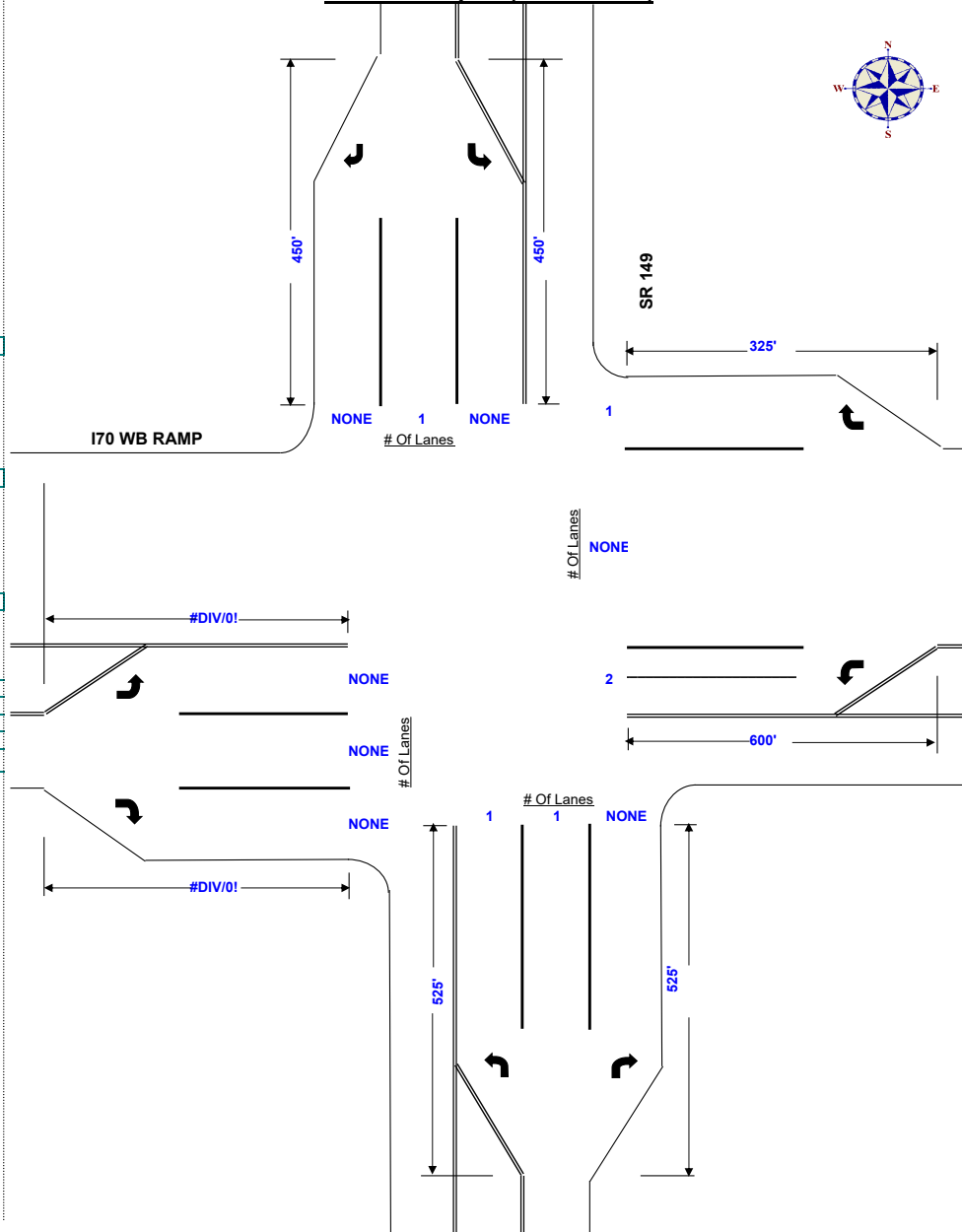
Turn Lane Length and Through Storage (ft.)

<u>Eastbound</u>		<u>Westbound</u>	
Left	#DIV/0!	Left	600
Through	100	2nd Left	550
Right	#DIV/0! #DIV/0!	Through	100
		Right	325

<u>Northbound</u>		<u>Southbound</u>	
Left	525	Left	450
Through	525	Through	450
Right	525	Right	450

### Standard Layout (Not to scale)





**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn

NBL

AM MID PM

Design Speed 45 mph

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 190 180 170 vehicles

No. of turn lanes 1

Through Volume 230 180 380 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 5 6 6

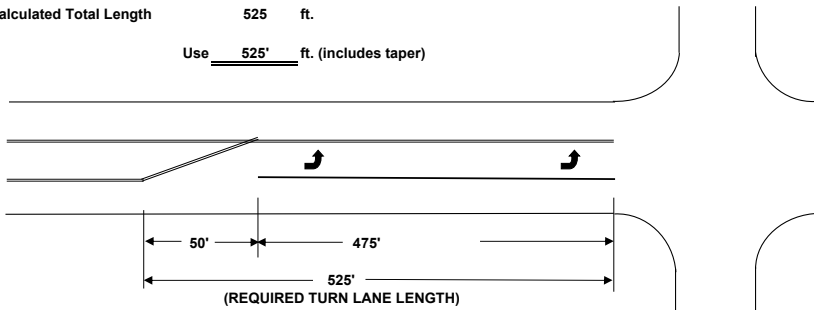
Calculated Turn Lane Length 275 325 325

Turning Length/lane 275 325 325

Backup Check  
Vehicles/cycle 6 6 13  
Backup Length 250 250 475  
Backup Length/lane 250 250 475

Calculated Total Length 525 ft.

Use 525' ft. (includes taper)



Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

AM						
S= 325						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 45.2381 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	250	250	325	325	325	325
USC	250	250	250	250	250	250
UTR	250	250	325	175	325	175

MID						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 50 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	375	375	375	375
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

PM						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	361	361	361	175
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

A	
1	50
2	100
3	150
4	175
5	200
6	250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn

SBL

AM      MID      PM

Design Speed 45 mph

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 0   0   0 vehicles

No. of turn lanes 1

Through Volume 430   290   330 vehicles

No. of through lanes 1

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle	1	1	1
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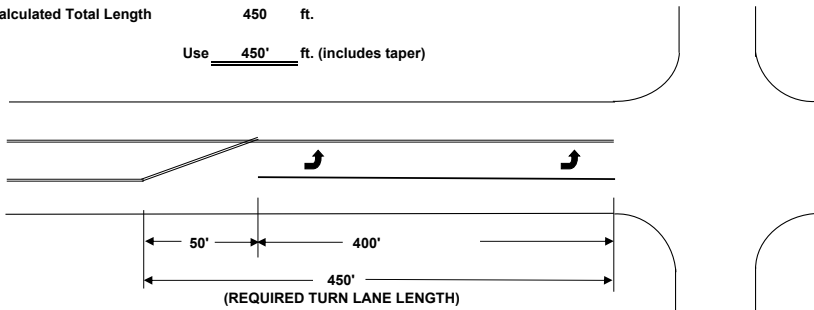
Calculated Turn Lane Length	125	125	125
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Turning Length/lane	125	125	125
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<b>Backup Check</b>			
Vehicles/cycle	11	9	11
Backup Length	400	350	400
Backup Length/lane	400	350	400

Calculated Total Length      **450**      ft.

Use 450' ft. (includes taper)



Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

AM						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 AM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 PM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175 USC= FALSE UTR= FALSE SPEED = 30-35 PM 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1                    50
- 2                    100
- 3                    150
- 4                    175
- 5                    200
- 6                    250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn

EBL

Calc. By: DLW

**AM**      **MID**      **PM**

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 0 0 0 vehicles

No. of turn lanes 1

Through Volume 0 0 0 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour            40            33            30

Vehicles/cycle            1            1            1

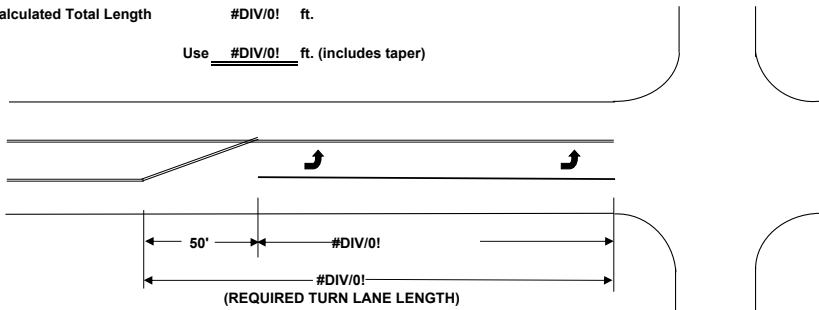
Calculated Turn Lane Length    #DIV/0!    #DIV/0!    #DIV/0!

Turning Length/lane            #DIV/0!    #DIV/0!    #DIV/0!

Backup Check  
Vehicles/cycle            1            1            1  
Backup Length            50          50          50  
Backup Length/lane       50          50          50

Calculated Total Length        #DIV/0! ft.

Use #DIV/0! ft. (includes taper)



**CHARTS**

AM						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M.    #DIV/0!    #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M.    #DIV/0!    #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M.    100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1            50
- 2            100
- 3            150
- 4            175
- 5            200
- 6            250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn WBL  
 Design Speed AM MID PM  
45 mph

Type of traffic Control: S  
 SIGNALIZED  
 UNSIGNALIZED STOPPED CROSSROAD  
 UNSIGNALIZED THROUGH ROAD

Turning Volume 520 400 280 vehicles

No. of turn lanes 1

Through Volume 10 10 10 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 13 13 10

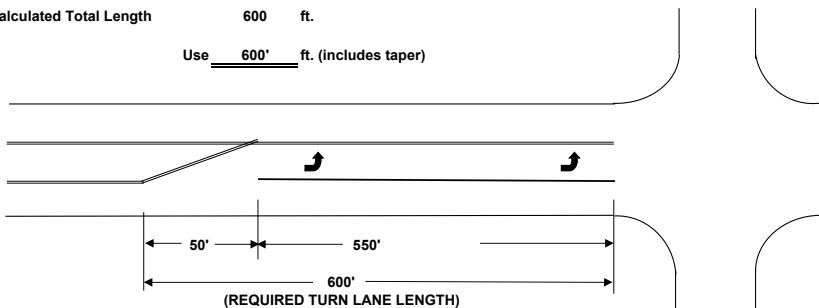
Calculated Turn Lane Length 550 550 550

Turning Length/lane 550 550 550

Backup Check  
 Vehicles/cycle 1 1 1  
 Backup Length 50 50 50  
 Backup Length/lane 50 50 50

Calculated Total Length 600 ft.

Use 600' ft. (includes taper)



Calc. By: DLW  
 Check By: J Hamilton  
 Date: 6/26/2024

**CHARTS**

AM						
S= 600						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 98.11321 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	525	525	600	600	600	600
USC	525	525	525	525	525	525
UTR	525	525	600	175	600	175

MID						
S= 600						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 97.56098 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	525	525	600	600	600	600
USC	525	525	525	525	525	525
UTR	525	525	600	175	600	175

PM						
S= 600						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	425	425	586	586	586	175
USC	425	425	425	425	425	425
UTR	425	425	500	175	500	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn NBR

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 0 0 0 vehicles

No. of turn lanes 1

Through Volume 230 180 380 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

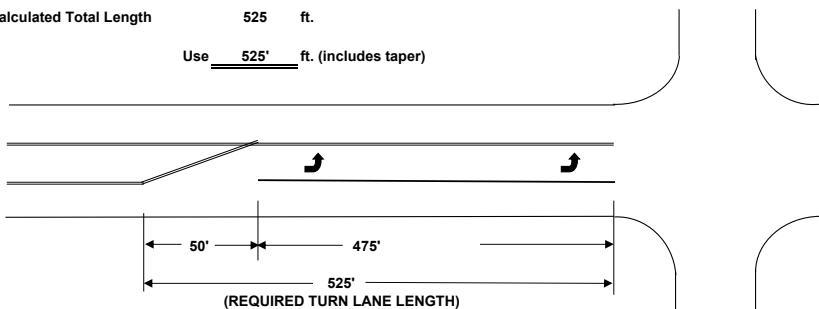
Calculated Turn Lane Length 125 125 125

Turning Length/lane 125 125 125

Backup Check  
Vehicles/cycle 6 6 13  
Backup Length 250 250 475  
Backup Length/lane 250 250 475

Calculated Total Length 525 ft.

Use 525' ft. (includes taper)



**CHARTS**

AM						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 AM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 PM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175 USC= FALSE UTR= FALSE SPEED = 30-35 PM 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn SBR  
 Design Speed AM MID PM  
45 mph

Calc. By: DLW  
 Check By: J Hamilton  
 Date: 6/26/2024

Type of traffic Control: S  
 SIGNALIZED  
 UNSIGNALIZED STOPPED CROSSROAD  
 UNSIGNALIZED THROUGH ROAD

Turning Volume 80 60 70 vehicles

No. of turn lanes 1

Through Volume 350 230 330 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 2 2 3

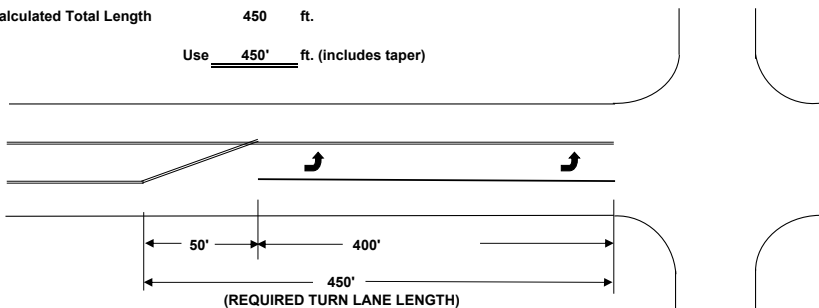
Calculated Turn Lane Length 175 175 175

Turning Length/lane 175 175 175

Backup Check  
 Vehicles/cycle 9 8 11  
 Backup Length 350 325 400  
 Backup Length/lane 350 325 400

Calculated Total Length 450 ft.

Use 450' ft. (includes taper)



**CHARTS**

AM						
S= 225 USC= FALSE UTR= FALSE SPEED = 40-45 AM % OF TRAFFIC TURNING A.M. 18.60465 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 225 USC= FALSE UTR= FALSE SPEED = 40-45 PM % OF TRAFFIC TURNING P.M. 20.68966 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

PM						
S= 225 USC= FALSE UTR= FALSE SPEED = 30-35 PM % OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	200	200	211	211	211	175
USC	200	200	200	200	200	200
UTR	200	200	275	175	275	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn

EBR

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 0 0 0 vehicles

No. of turn lanes 1

Through Volume 0 0 0 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

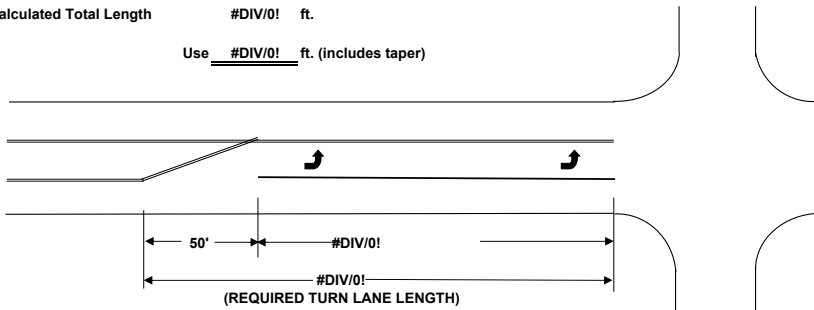
Calculated Turn Lane Length #DIV/0! #DIV/0! #DIV/0!

Turning Length/lane #DIV/0! #DIV/0! #DIV/0!

Backup Check  
Vehicles/cycle 1 1 1  
Backup Length 50 50 50  
Backup Length/lane 50 50 50

Calculated Total Length #DIV/0! ft.

Use #DIV/0! ft. (includes taper)



**CHARTS**

AM						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. #DIV/0! #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. #DIV/0! #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

A	
1	50
2	100
3	150
4	175
5	200
6	250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 WB RAMP & SR 149  
2047 BUILD

Turn: EBR

Design Speed: AM MID PM 45 mph

Type of traffic Control: S

Turning Volume: 180 160 180 vehicles

No. of turn lanes: 1

Through Volume: 10 10 10 vehicles

No. of through lanes: 1

Cycle length: 90 110 120 secs.

Cycle per hour: 40 33 30

Vehicles/cycle	5	5	6
----------------	---	---	---

Calculated Turn Lane Length: 275 275 275

Turning Length/lane: 275 275 275

Backup Check

Vehicles/cycle	1	1	1
Backup Length	50	50	50
Backup Length/lane	50	50	50

Calculated Total Length: **325** ft.

Use 325' ft. (includes taper)

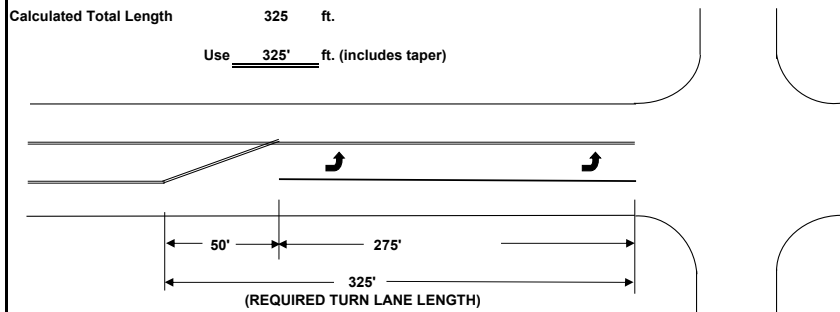
Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

AM						
S= 325						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 94.73684 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	250	250	325	325	325	325
USC	250	250	250	250	250	250
UTR	250	250	325	175	325	175

MID						
S= 325						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 94.11765 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	250	250	325	325	325	325
USC	250	250	250	250	250	250
UTR	250	250	325	175	325	175

PM						
S= 325						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	311	311	311	175
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175



A	
1	50
2	100
3	150
4	175
5	200
6	250



## Turn Lane Length Worksheet

### Design Data

**Project ID:** BEL-70-9.35      **Date:** 26-Jun-24  
**E-W Road:** I70 EB RAMP      **N-S Road:** SR 149  
**Analyst:** DLW      **Checked By:** J Hamilton  
**Analyzed Year:** 2047 BUILD

**Input Values:**

**Type of Traffic Control:** S

SIGNALIZED    OR     UNSIGNALIZED STOPPED CROSSROAD    OR     UNSIGNALIZED THROUGH ROAD

#### AM Peak Hour Volume (vehicles)

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
50	10	220	0	0	0	0	370	0	160	710	0

#### MID Peak Hour Volume (vehicles)

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
40	10	170	0	0	0	0	320	0	110	520	0

#### PM Peak Hour Volume (vehicles)

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
60	10	170	0	0	0	0	490	0	170	440	0

#### Intersection Geometry - Number of Lanes (Use 0 if Turn Lane is Shared, i.e., Not Exclusive)

Eastbound		Westbound		Northbound		Southbound	
Left	0	Left	0	Left	0	Left	1
Through	1	Through	0	Through	2	Through	2
Right	1	Right	0	Right	0	Right	0
Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n
Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0

#### Design Speed (mph)

Eastbound	Westbound	Northbound	Southbound
30	0	45	45

#### Cycle Length

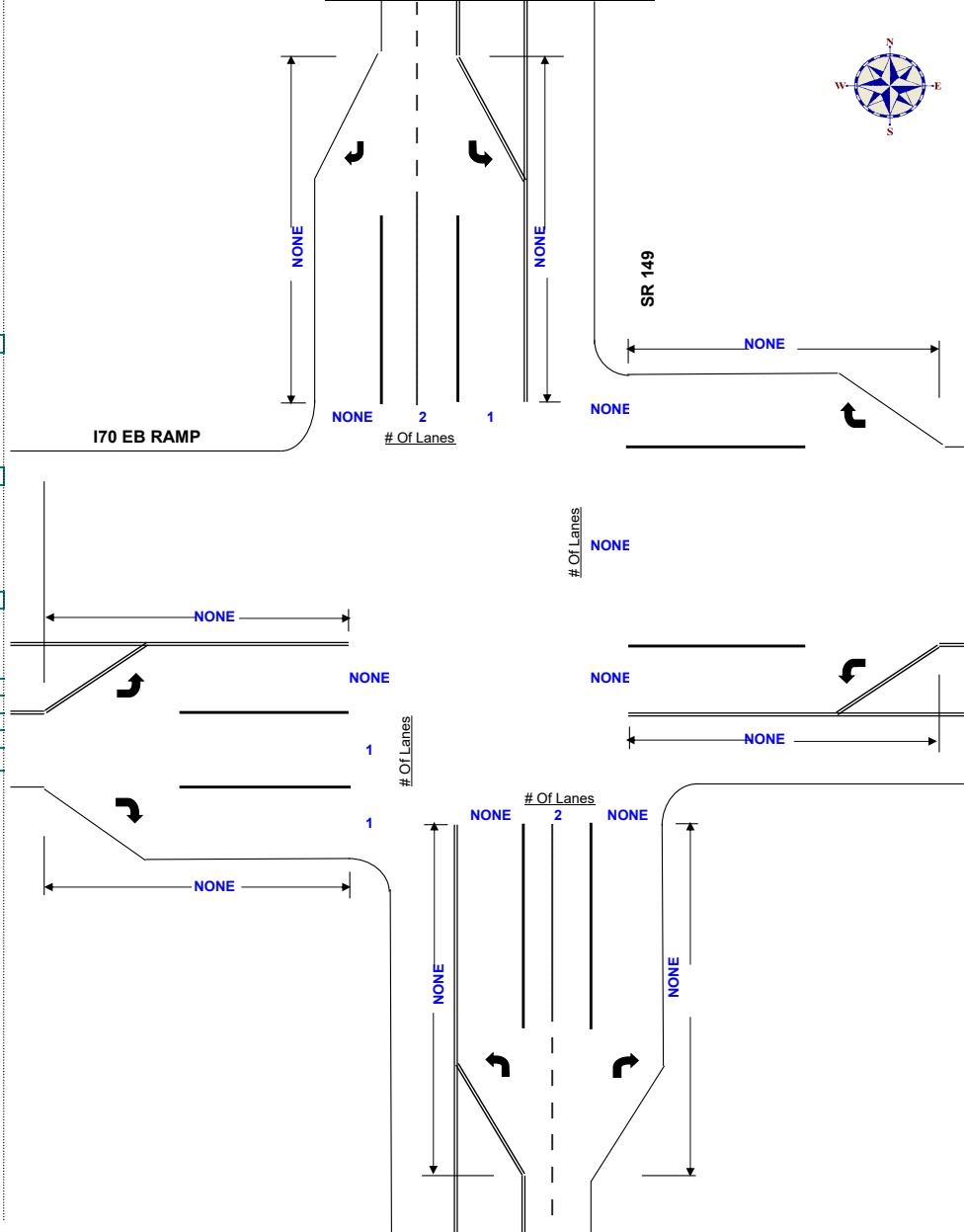
AM (sec)	90
MID (sec)	110
PM (sec)	120

#### Analysis Results:

Turn Lane Length and Through Storage (ft.)

Eastbound		Westbound	
Left	NONE	Left	NONE
Through	75	Through	75
Right	NONE	Right	NONE
Northbound		Southbound	
Left	NONE	Left	NONE
Through	350	Through	362.5
Right	NONE	Right	NONE

### Standard Layout (Not to scale)



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn

NBL

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 0 0 0 vehicles

No. of turn lanes 0

Through Volume 370 320 490 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

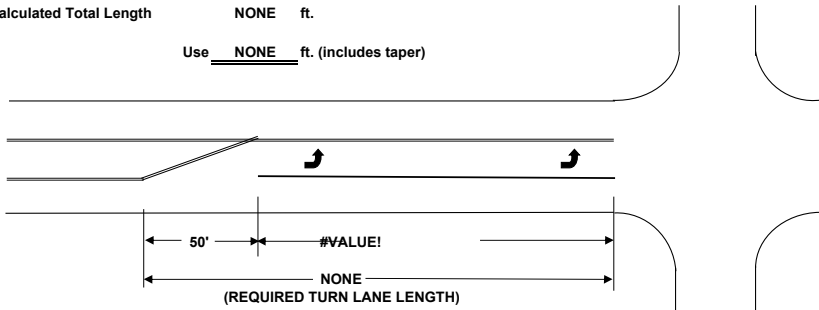
Calculated Turn Lane Length 125 125 125

Turning Length/lane NONE NONE NONE

Backup Check  
Vehicles/cycle 10 10 17  
Backup Length 375 375 600  
Backup Length/lane 187.5 187.5 300

Calculated Total Length NONE ft.

Use NONE ft. (includes taper)



**CHARTS**

AM						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 AM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 PM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175 USC= FALSE UTR= FALSE SPEED = 30-35 PM 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn

Design Speed  mph

Type of traffic Control:

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume    vehicles

No. of turn lanes

Through Volume    vehicles

No. of through lanes

Cycle length    secs.

Cycle per hour 40 33 30

Vehicles/cycle	4	4	6
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Calculated Turn Lane Length 250 250 250

Turning Length/lane NONE NONE NONE

Backup Check

Vehicles/cycle	18	16	15
Backup Length	625	550	525
Backup Length/lane	312.5	275	262.5

Calculated Total Length NONE ft.

Use NONE ft. (includes taper)

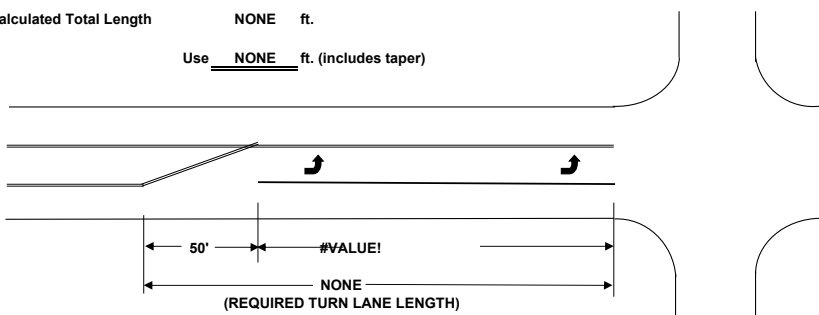
Calc. By: DLW  
 Check By: J Hamilton  
 Date: 6/26/2024

**CHARTS**

AM						
S= 300 USC= FALSE UTR= FALSE SPEED = 40-45 AM 18.3908 HIGH						
% OF TRAFFIC TURNING A.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	225	225	300	300	300	300
USC	225	225	225	225	225	225
UTR	225	225	300	175	300	175

MID						
S= 300 USC= FALSE UTR= FALSE SPEED = 40-45 PM 17.46032 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	225	225	300	300	300	300
USC	225	225	225	225	225	225
UTR	225	225	300	175	300	175

PM						
S= 300 USC= FALSE UTR= FALSE SPEED = 30-35 PM 100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	286	286	286	175
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175



- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn

EBL

AM      MID      PM

Design Speed 45 mph

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 50   40   60 vehicles

No. of turn lanes 0

Through Volume 10   10   10 vehicles

No. of through lanes 2

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle      2      2      2

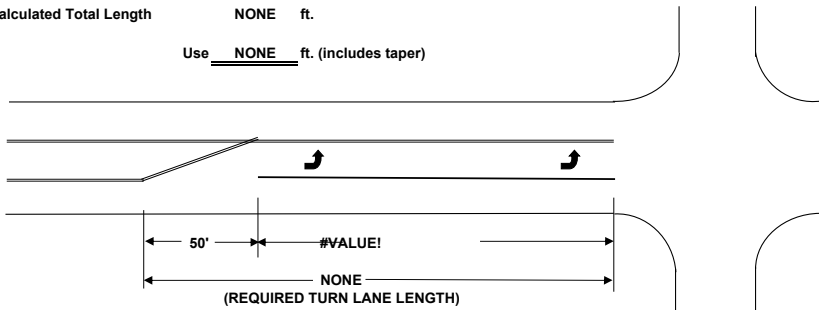
Calculated Turn Lane Length      175      175      175

Turning Length/lane      NONE      NONE      NONE

**Backup Check**  
Vehicles/cycle      1      1      1  
Backup Length      50      50      50  
Backup Length/lane      25      25      25

Calculated Total Length      NONE      ft.

Use NONE ft. (includes taper)



Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

AM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 83.33333 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 80 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

PM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	211	211	211	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

- A
- 1      50
- 2      100
- 3      150
- 4      175
- 5      200
- 6      250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn

WBL

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 0 0 0 vehicles

No. of turn lanes 0

Through Volume 0 0 0 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 1 1

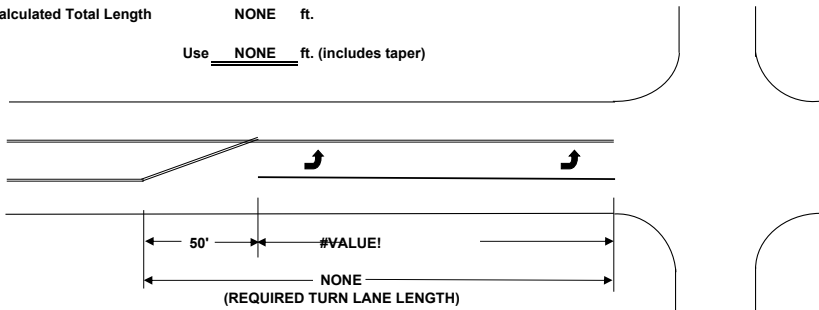
Calculated Turn Lane Length #DIV/0! #DIV/0! #DIV/0!

Turning Length/lane NONE NONE NONE

Backup Check  
Vehicles/cycle 1 1 1  
Backup Length 50 50 50  
Backup Length/lane 25 25 25

Calculated Total Length NONE ft.

Use NONE ft. (includes taper)



**CHARTS**

AM						
S= #DIV/0! USC= FALSE UTR= FALSE SPEED = 40-45 AM #DIV/0! #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= #DIV/0! USC= FALSE UTR= FALSE SPEED = 40-45 PM #DIV/0! #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= #DIV/0! USC= FALSE UTR= FALSE SPEED = 30-35 PM 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn

Design Speed  mph

Type of traffic Control:

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume    vehicles

No. of turn lanes

Through Volume    vehicles

No. of through lanes

Cycle length    secs.

Cycle per hour 40 33 30

Vehicles/cycle	1	1	1
----------------	---	---	---

Calculated Turn Lane Length 125 125 125

Turning Length/lane NONE NONE NONE

Backup Check

Vehicles/cycle	10	10	17
Backup Length	375	375	600
Backup Length/lane	187.5	187.5	300

Calculated Total Length NONE ft.

Use NONE ft. (includes taper)

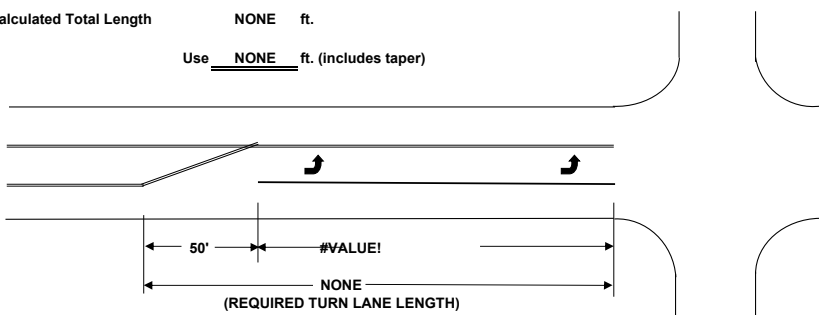
Calc. By: DLW  
 Check By: J Hamilton  
 Date: 6/26/2024

**CHARTS**

AM						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 AM 0 LOW						
% OF TRAFFIC TURNING A.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 PM 0 LOW						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175 USC= FALSE UTR= FALSE SPEED = 30-35 PM 100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175



- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn

SBR

Calc. By: DLW

AM    MID    PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 0 | 0 | 0 vehicles

No. of turn lanes | 0

Through Volume 710 | 520 | 440 vehicles

No. of through lanes | 2

Cycle length 90 | 110 | 120 secs.

Cycle per hour            40            33            30

Vehicles/cycle            1            1            1

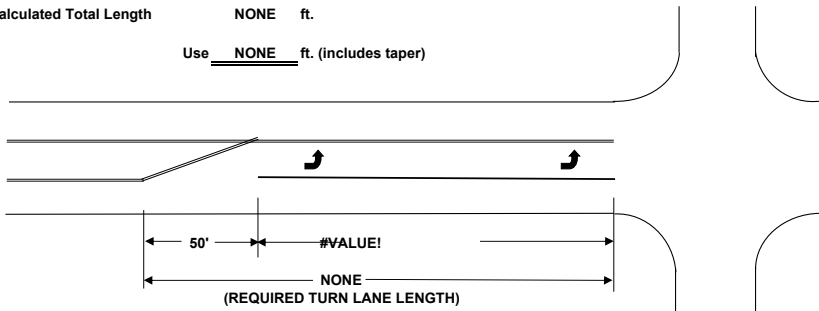
Calculated Turn Lane Length    125    125    125

Turning Length/lane    NONE    NONE    NONE

**Backup Check**  
Vehicles/cycle            18            16            15  
Backup Length            625            550            525  
Backup Length/lane       312.5            275            262.5

Calculated Total Length    NONE    ft.

Use NONE ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
0 LOW						
% OF TRAFFIC TURNING A.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
0 LOW						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1            50
- 2            100
- 3            150
- 4            175
- 5            200
- 6            250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn EBR  
 Design Speed AM MID PM  
45 mph

Calc. By: DLW  
 Check By: J Hamilton  
 Date: 6/26/2024

Type of traffic Control: S  
 SIGNALIZED  
 UNSIGNALIZED STOPPED CROSSROAD  
 UNSIGNALIZED THROUGH ROAD

Turning Volume 220 170 170 vehicles

No. of turn lanes 0

Through Volume 60 50 70 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 6 6 6

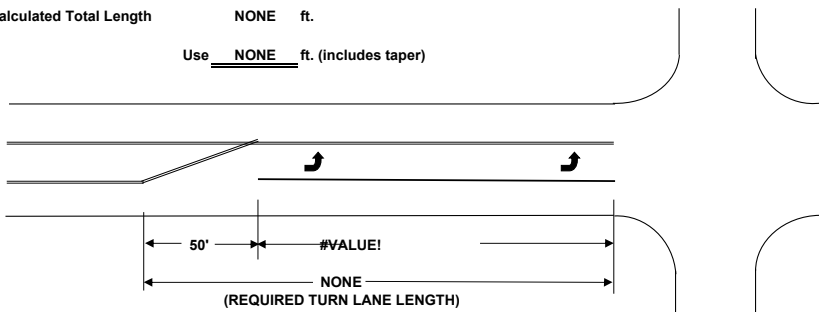
Calculated Turn Lane Length 325 325 325

Turning Length/lane NONE NONE NONE

Backup Check  
 Vehicles/cycle 2 2 3  
 Backup Length 100 100 150  
 Backup Length/lane 50 50 75

Calculated Total Length NONE ft.

Use NONE ft. (includes taper)



**CHARTS**

AM						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 78.57143 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	375	375	375	375
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

MID						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 77.27273 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	375	375	375	375
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

PM						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	361	361	361	175
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

170 EB RAMP & SR 149  
2047 BUILD

Turn

EBR

Calc. By: DLW

AM    MID    PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 0 0 0 vehicles

No. of turn lanes 0

Through Volume 0 0 0 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour            40            33            30

Vehicles/cycle            1            1            1

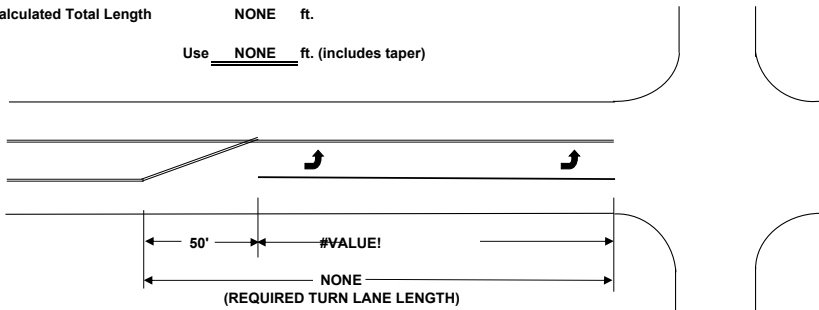
Calculated Turn Lane Length    #DIV/0!    #DIV/0!    #DIV/0!

Turning Length/lane            NONE            NONE            NONE

Backup Check  
Vehicles/cycle            1            1            1  
Backup Length            50            50            50  
Backup Length/lane        25            25            25

Calculated Total Length            NONE    ft.

Use NONE ft. (includes taper)



**CHARTS**

AM						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M.    #DIV/0!    #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M.    #DIV/0!    #DIV/0!						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= #DIV/0!						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M.    100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1            50
- 2            100
- 3            150
- 4            175
- 5            200
- 6            250

## Turn Lane Length Worksheet

### Design Data

**Project ID:** BEL-70-9.35      **Date:** 26-Jun-24  
**E-W Road:** RECO DRIVE      **N-S Road:** SR 149  
**Analyst:** DLW      **Checked By:** J Hamilton  
**Analyzed Year:** 2047 BUILD

**Input Values:**

**Type of Traffic Control:** S

SIGNALIZED    OR     UNSIGNALIZED STOPPED CROSSROAD    OR     UNSIGNALIZED THROUGH ROAD

**AM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10	0	70	12	0	45	60	630	20	50	835	95

**MID Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10	0	60	180	0	60	60	470	30	40	520	170

**PM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10	0	60	165	0	110	55	830	20	60	380	230

**Intersection Geometry - Number of Lanes (Use 0 if Turn Lane is Shared, i.e., Not Exclusive)**

Eastbound		Westbound		Northbound		Southbound	
Left	1	Left	0	Left	1	Left	1
Through	1	Through	1	Through	2	Through	2
Right	0	Right	0	Right	0	Right	1
Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n
Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0

**Design Speed (mph)**

Eastbound	Westbound	Northbound	Southbound
30	30	45	45

**Cycle Length**

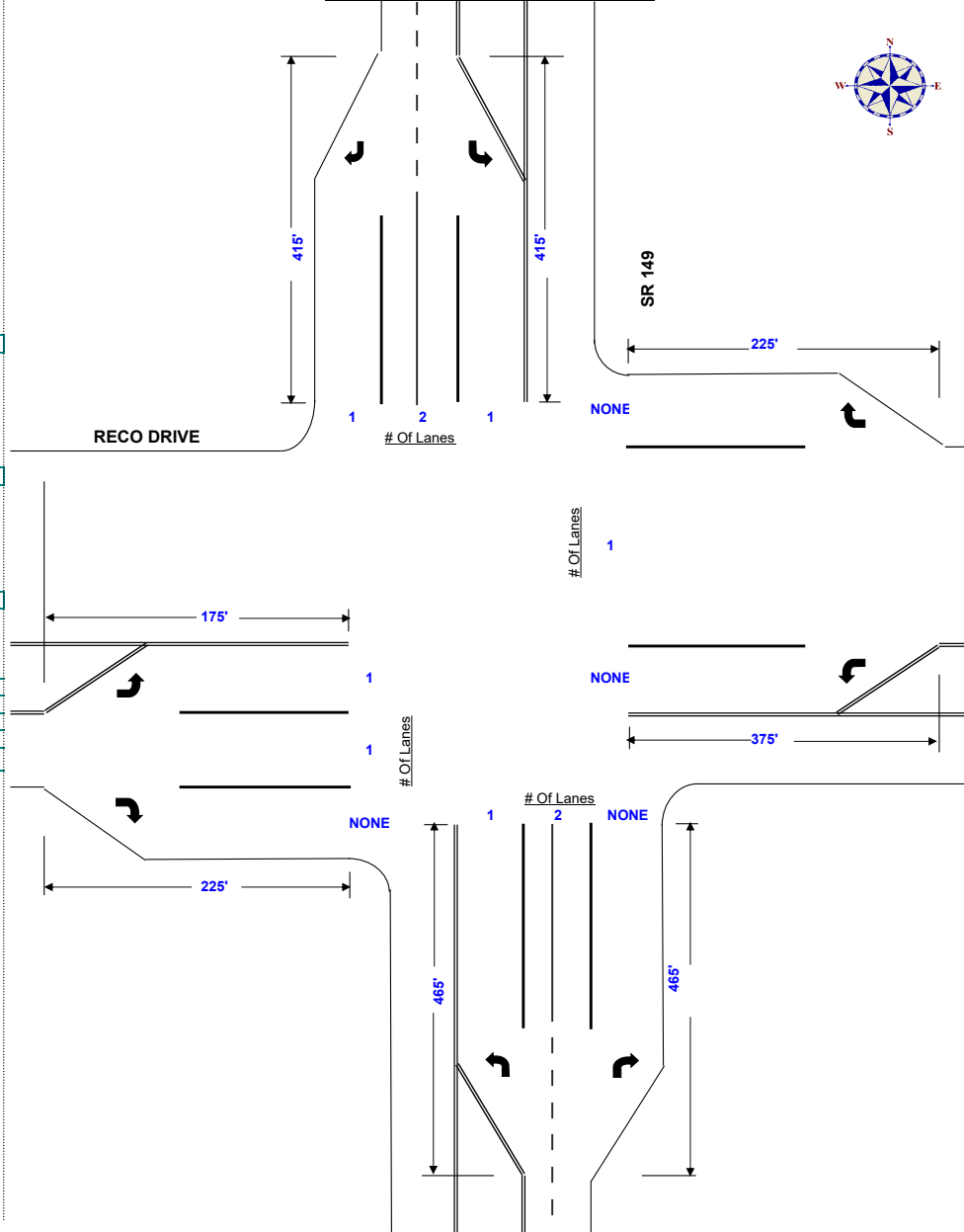
AM (sec)	90
MID (sec)	110
PM (sec)	120

**Analysis Results:**

Turn Lane Length and Through Storage (ft.)

<b>Eastbound</b>		<b>Westbound</b>	
Left	175	Left	375
Through	100	Through	100
Right	225	Right	225
<b>Northbound</b>		<b>Southbound</b>	
Left	465	Left	415
Through	462.5	Through	412.5
Right	465	Right	415

### Standard Layout (Not to scale)



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

RECO DRIVE & SR 149  
2047 BUILD

Turn NBL

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 60 60 55 vehicles

No. of turn lanes 1

Through Volume 650 500 830 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 2 2 2

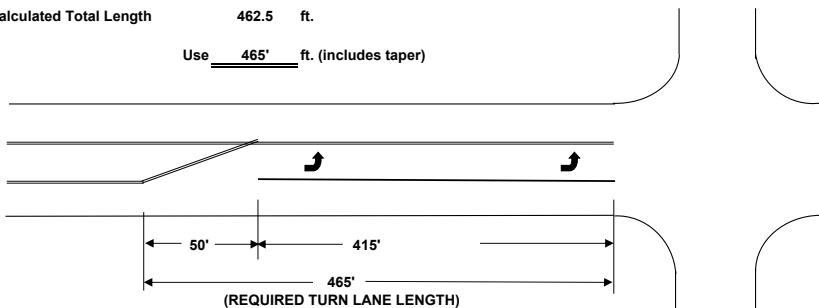
Calculated Turn Lane Length 175 175 175

Turning Length/lane 175 175 175

Backup Check  
Vehicles/cycle 17 16 28  
Backup Length 600 550 825  
Backup Length/lane 300 275 412.5

Calculated Total Length 462.5 ft.

Use 465' ft. (includes taper)



**CHARTS**

AM						
S= 225 USC= FALSE UTR= FALSE SPEED = 40-45 AM % OF TRAFFIC TURNING A.M. 8.450704 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 225 USC= FALSE UTR= FALSE SPEED = 40-45 PM % OF TRAFFIC TURNING P.M. 10.71429 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

PM						
S= 225 USC= FALSE UTR= FALSE SPEED = 30-35 PM % OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	211	211	211	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

**RECO DRIVE & SR 149**  
**2047 BUILD**

Turn SBL

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 50 40 60 vehicles

No. of turn lanes 1

Through Volume 835 520 380 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 2 2 2

Calculated Turn Lane Length 175 175 175

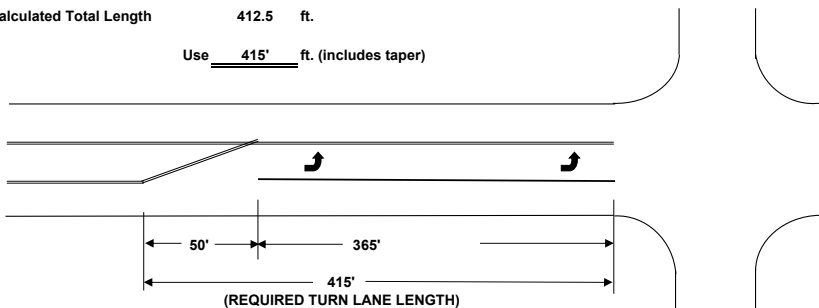
Turning Length/lane 175 175 175

Backup Check

Vehicles/cycle	21	16	13
Backup Length	725	550	475
Backup Length/lane	362.5	275	237.5

Calculated Total Length **412.5** ft.

Use 415' ft. (includes taper)



**CHARTS**

AM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 5.649718 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 7.142857 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

PM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	211	211	211	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

A	
1	50
2	100
3	150
4	175
5	200
6	250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

RECO DRIVE & SR 149  
2047 BUILD

Turn

EBL

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 10 10 10 vehicles

No. of turn lanes 1

Through Volume 70 60 0 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle	1	1	1
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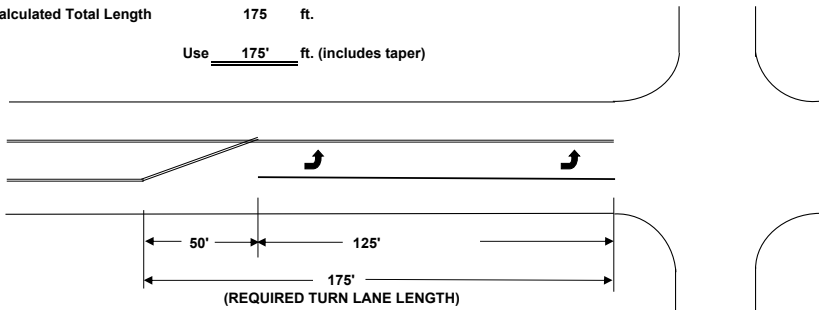
Calculated Turn Lane Length	125	125	125
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Turning Length/lane	125	125	125
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Backup Check			
Vehicles/cycle	2	2	1
Backup Length	100	100	50
Backup Length/lane	50	50	25

Calculated Total Length 175 ft.

Use 175' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
12.5 HIGH						
% OF TRAFFIC TURNING A.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
14.28571 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

RECO DRIVE & SR 149  
2047 BUILD

Turn WBL

Design Speed AM MID PM  
45 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 12 180 165 vehicles

No. of turn lanes 1

Through Volume 45 60 0 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 1 6 6

Calculated Turn Lane Length 125 325 325

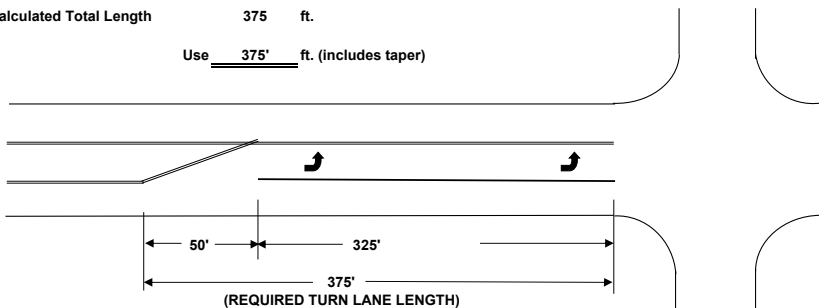
Turning Length/lane 125 325 325

Backup Check

Vehicles/cycle	2	2	1
Backup Length	100	100	50
Backup Length/lane	50	50	25

Calculated Total Length 375 ft.

Use 375' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 21.05263 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 75 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	375	375	375	375
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

PM						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	361	361	361	175
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

**RECO DRIVE & SR 149**  
**2047 BUILD**

**CHARTS**

Turn

NBR

Calc. By: DLW

**AM**      **MID**      **PM**

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 20   30   20 vehicles

No. of turn lanes 1

Through Volume 630   470   830 vehicles

No. of through lanes 2

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle	1	1	1
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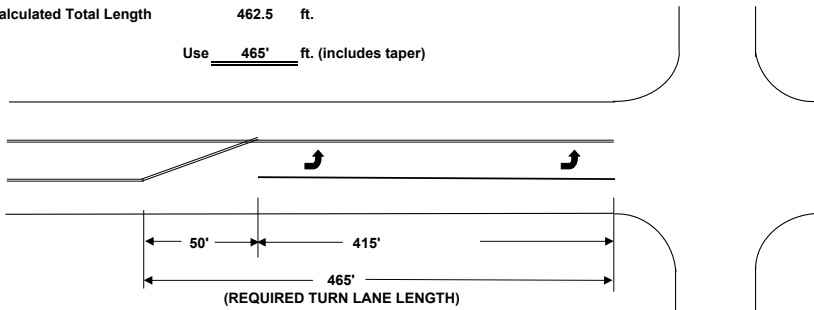
Calculated Turn Lane Length	125	125	125
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Turning Length/lane	125	125	125
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Backup Check			
Vehicles/cycle	16	15	28
Backup Length	550	525	825
Backup Length/lane	275	262.5	412.5

Calculated Total Length      **462.5**      ft.

Use 465' ft. (includes taper)



AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 3.076923 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 6 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1                      50
- 2                      100
- 3                      150
- 4                      175
- 5                      200
- 6                      250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

RECO DRIVE & SR 149  
2047 BUILD

Turn

SBR

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 95 170 230 vehicles

No. of turn lanes 1

Through Volume 835 520 380 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 3 6 8

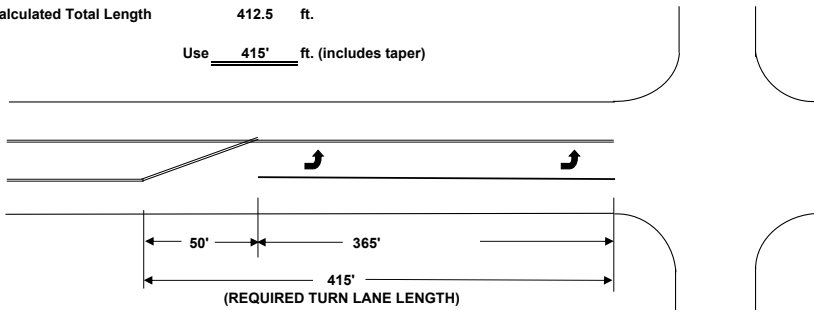
Calculated Turn Lane Length 225 325 325

Turning Length/lane 225 325 325

**Backup Check**  
Vehicles/cycle 21 16 13  
Backup Length 725 550 475  
Backup Length/lane 362.5 275 237.5

Calculated Total Length **412.5** ft.

Use 415' ft. (includes taper)



**CHARTS**

AM						
S= 275						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 10.21505 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	200	200	275	275	275	275
USC	200	200	200	200	200	200
UTR	200	200	275	175	275	175

MID						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 24.63768 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	300	300	375	375	375	375
USC	300	300	300	300	300	300
UTR	300	300	375	175	375	175

PM						
S= 375						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	375	375	361	361	361	175
USC	375	375	375	375	375	375
UTR	375	375	450	175	450	175

A	
1	50
2	100
3	150
4	175
5	200
6	250



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

RECO DRIVE & SR 149  
2047 BUILD

Turn

EBR

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 70 60 60 vehicles

No. of turn lanes 1

Through Volume 0 0 0 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 2 2 2

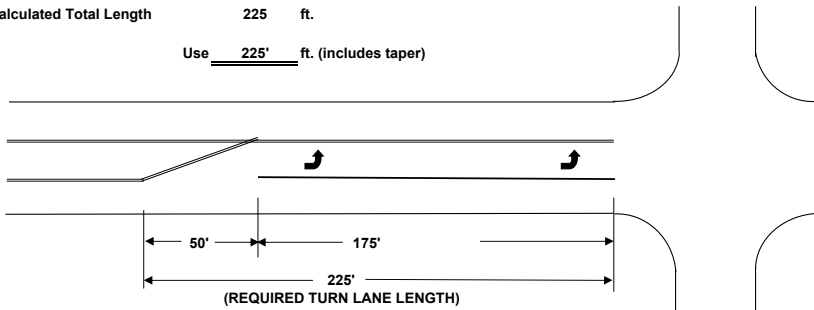
Calculated Turn Lane Length 175 175 175

Turning Length/lane 175 175 175

**Backup Check**  
Vehicles/cycle 1 1 1  
Backup Length 50 50 50  
Backup Length/lane 25 25 25

Calculated Total Length 225 ft.

Use 225' ft. (includes taper)



**CHARTS**

AM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
100 HIGH						
% OF TRAFFIC TURNING A.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

PM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
100 HIGH						
% OF TRAFFIC TURNING P.M.						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	211	211	211	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

A	
1	50
2	100
3	150
4	175
5	200
6	250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

**RECO DRIVE & SR 149**  
**2047 BUILD**

Turn

EBR

Calc. By: DLW

**AM MID PM**

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 45 60 110 vehicles

No. of turn lanes 1

Through Volume 12 180 165 vehicles

No. of through lanes 2

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 2 2 4

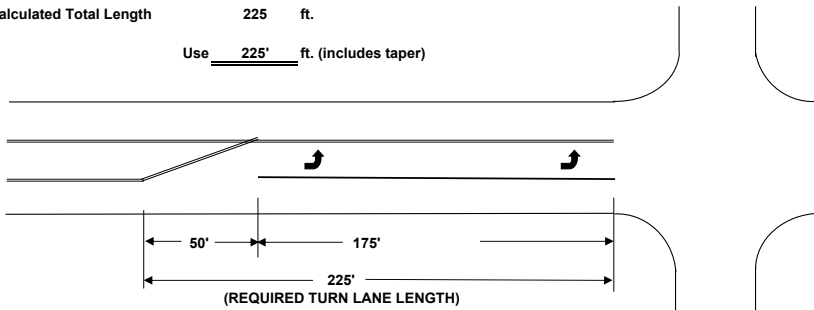
Calculated Turn Lane Length 175 175 175

Turning Length/lane 175 175 175

Backup Check  
Vehicles/cycle 1 6 6  
Backup Length 50 250 250  
Backup Length/lane 25 125 125

Calculated Total Length **225** ft.

Use 225' ft. (includes taper)



**CHARTS**

AM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 78.94737 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 25 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

PM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	225	225	211	211	211	175
USC	225	225	225	225	225	225
UTR	225	225	300	175	300	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

## Turn Lane Length Worksheet

### Design Data

**Project ID:** BEL-70-9.35      **Date:** 26-Jun-24  
**E-W Road:** LOVES TRUCK ACCESS      **N-S Road:** SR 149  
**Analyst:** DLW      **Checked By:** J Hamilton  
**Analyzed Year:** 2047 BUILD

**Input Values:**

**Type of Traffic Control:** S

SIGNALIZED    OR     UNSIGNALIZED STOPPED CROSSROAD    OR     UNSIGNALIZED THROUGH ROAD

**AM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
80	0	25	10	0	80	0	500	10	70	770	95

**MID Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
20	0	10	10	0	70	0	420	10	90	460	30

**PM Peak Hour Volume (vehicles)**

Eastbound			Westbound			Northbound			Southbound		
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
65	0	0	10	0	50	55	800	10	50	390	10

**Intersection Geometry - Number of Lanes (Use 0 if Turn Lane is Shared, i.e., Not Exclusive)**

Eastbound		Westbound		Northbound		Southbound	
Left	0	Left	0	Left	1	Left	1
Through	1	Through	1	Through	1	Through	1
Right	0	Right	0	Right	0	Right	1
Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n	Offset Left ? (y,n)	n
Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0	Offset Dist. (ft.)	0

**Design Speed (mph)**

Eastbound	Westbound	Northbound	Southbound
25	25	45	45

**Cycle Length**

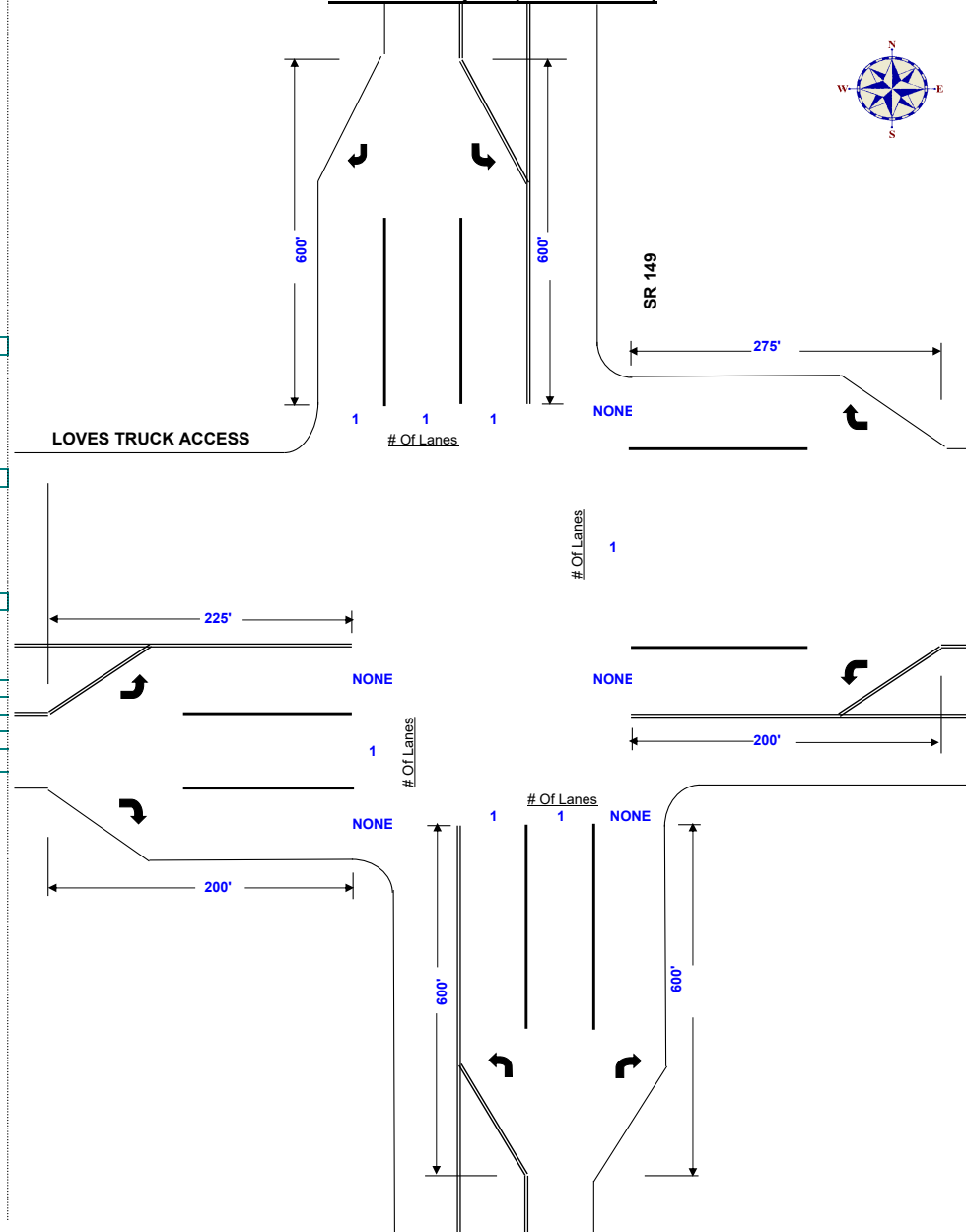
AM (sec)	90
MID (sec)	110
PM (sec)	120

**Analysis Results:**

Turn Lane Length and Through Storage (ft.)

<u>Eastbound</u>		<u>Westbound</u>	
Left	225	Left	200
Through	100	Through	200
Right	200	Right	275
<u>Northbound</u>		<u>Southbound</u>	
Left	600 Lane Blocked	Left	600 Lane Blocked
Through	875	Through	725
Right	600 Lane Blocked	Right	600 Lane Blocked

### Standard Layout (Not to scale)



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

NBL

AM      MID      PM

Design Speed 45 mph

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 0   0   55 vehicles

No. of turn lanes 1

Through Volume 510   430   800 vehicles

No. of through lanes 1

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle      1      1      2

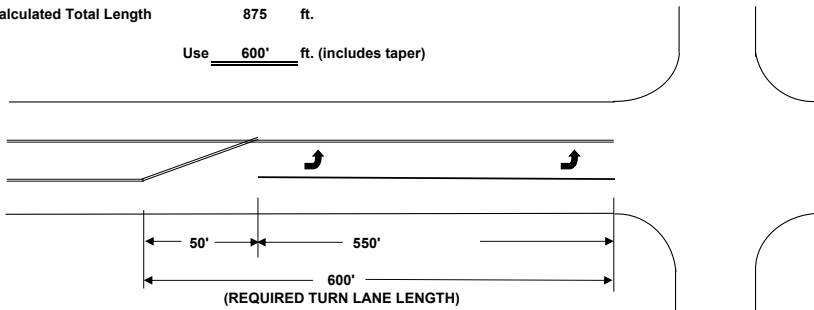
Calculated Turn Lane Length      125      125      125

Turning Length/lane      125      125      125

**Backup Check**  
Vehicles/cycle      13      14      27  
Backup Length      475      500      825  
Backup Length/lane      475      500      825

Calculated Total Length      875      ft.

Use 600' ft. (includes taper)



Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

AM						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 AM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175 USC= FALSE UTR= FALSE SPEED = 40-45 PM 0 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175 USC= FALSE UTR= FALSE SPEED = 30-35 PM 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	175	175	175	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

- A
- 1      50
- 2      100
- 3      150
- 4      175
- 5      200
- 6      250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

SBL

Calc. By: DLW

**AM**      **MID**      **PM**

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 70   90   50 vehicles

No. of turn lanes 1

Through Volume 770   460   390 vehicles

No. of through lanes 1

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle	2	3	2
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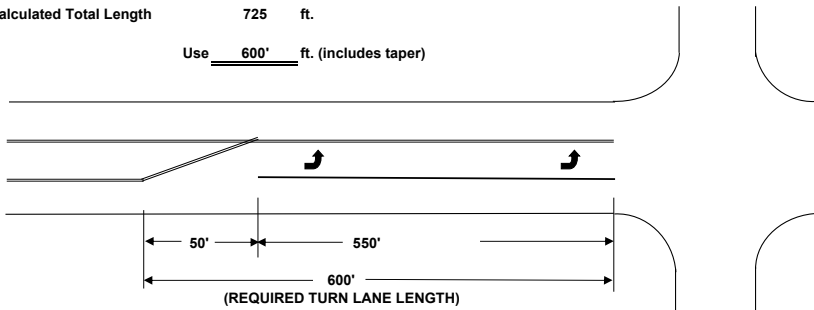
Calculated Turn Lane Length	175	225	225
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Turning Length/lane	175	225	225
---------------------	-----	-----	-----

<b>Backup Check</b>			
Vehicles/cycle	20	15	13
Backup Length	675	525	475
Backup Length/lane	675	525	475

Calculated Total Length      725      ft.

Use 600' ft. (includes taper)



**CHARTS**

AM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 8.333333 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 275						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 16.36364 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	200	200	275	275	275	275
USC	200	200	200	200	200	200
UTR	200	200	275	175	275	175

PM						
S= 275						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	261	261	261	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

- A
- 1                      50
- 2                      100
- 3                      150
- 4                      175
- 5                      200
- 6                      250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

EBL

**AM**      **MID**      **PM**

Design Speed 45 mph

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 80   20   65 vehicles

No. of turn lanes | 1

Through Volume 25   10   0 vehicles

No. of through lanes | 1

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle 2   1   3

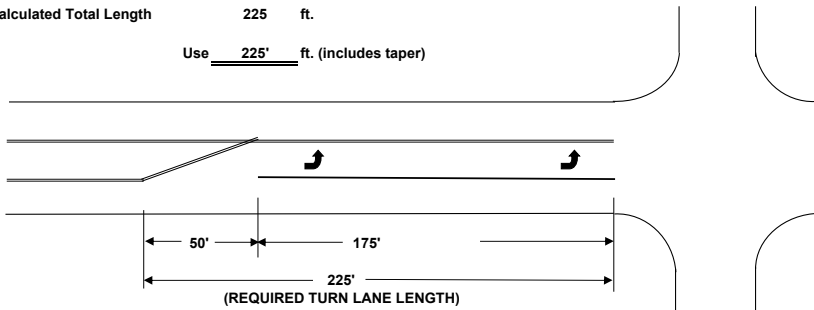
Calculated Turn Lane Length      175      125      125

Turning Length/lane 175   125   125

Backup Check  
Vehicles/cycle      1      1      1  
Backup Length      50      50      50  
Backup Length/lane      50      50      50

Calculated Total Length      225      ft.

Use 225' ft. (includes taper)



Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

AM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 76.19048 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 66.66667 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	200	200	175	175	175	175
USC	200	200	200	200	200	200
UTR	200	200	275	175	275	175

- A
- 1      50
- 2      100
- 3      150
- 4      175
- 5      200
- 6      250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

Design Speed 

AM	MID	PM
	45	

 mph

Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

Type of traffic Control:

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 

10	10	10
----	----	----

 vehicles

No. of turn lanes 

1
---

Through Volume 

80	70	0
----	----	---

 vehicles

No. of through lanes 

1
---

Cycle length 

90	110	120
----	-----	-----

 secs.

Cycle per hour 

40	33	30
----	----	----

Vehicles/cycle	1	1	1
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Calculated Turn Lane Length	125	125	125
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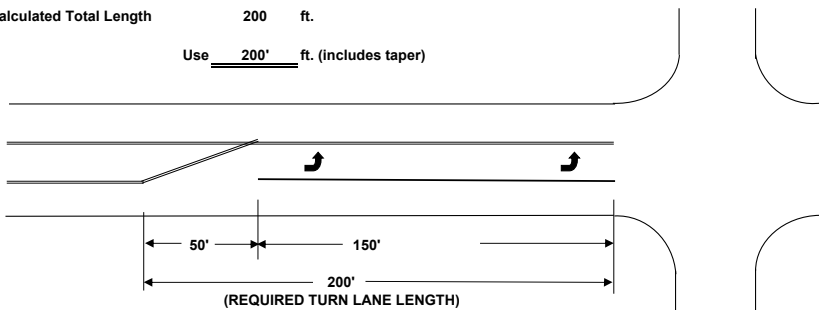
Turning Length/lane	125	125	125
---------------------	-----	-----	-----

Backup Check

Vehicles/cycle	2	3	1
Backup Length	100	150	50
Backup Length/lane	100	150	50

Calculated Total Length **200** ft.

Use 200' ft. (includes taper)



AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 11.11111 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 12.5 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

NBR

AM MID PM

Design Speed 45 mph

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 10 10 10 vehicles

No. of turn lanes 1

Through Volume 500 420 800 vehicles

No. of through lanes 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle	1	1	1
----------------	---	---	---

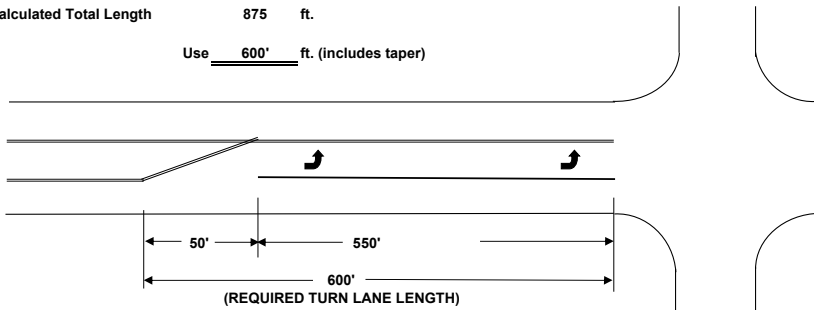
Calculated Turn Lane Length	125	125	125
-----------------------------	-----	-----	-----

Turning Length/lane	125	125	125
---------------------	-----	-----	-----

Backup Check			
Vehicles/cycle	13	13	27
Backup Length	475	475	825
Backup Length/lane	475	475	825

Calculated Total Length **875** ft.

Use 600' ft. (includes taper)



Calc. By: DLW  
Check By: J Hamilton  
Date: 6/26/2024

**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 1.960784 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 2.325581 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250



**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

SBR

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
UN SIGNALIZED STOPPED CROSSROAD  
UN SIGNALIZED THROUGH ROAD

Turning Volume 95 30 10 vehicles

No. of turn lanes | 1

Through Volume 770 460 390 vehicles

No. of through lanes | 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 3 1 1

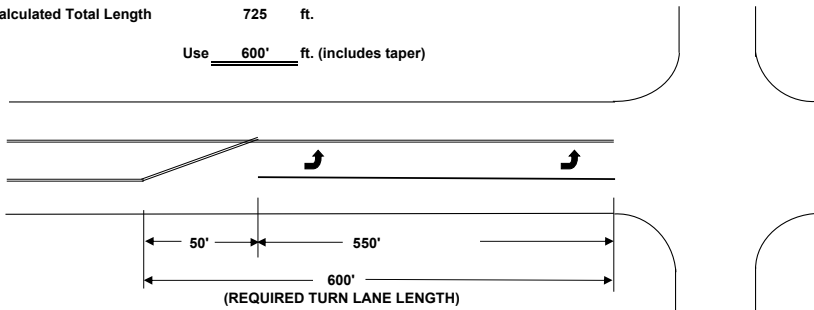
Calculated Turn Lane Length 225 125 125

Turning Length/lane 225 125 125

Backup Check  
Vehicles/cycle 20 15 13  
Backup Length 675 525 475  
Backup Length/lane 675 525 475

Calculated Total Length 725 ft.

Use 600' ft. (includes taper)



**CHARTS**

AM						
S= 275						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 10.98266 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	200	200	275	275	275	275
USC	200	200	200	200	200	200
UTR	200	200	275	175	275	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 6.122449 LOW						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

EBR

Calc. By: DLW

AM      MID      PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 25   10   0 vehicles

No. of turn lanes 1

Through Volume 80   20   65 vehicles

No. of through lanes 1

Cycle length 90   110   120 secs.

Cycle per hour      40      33      30

Vehicles/cycle	1	1	1
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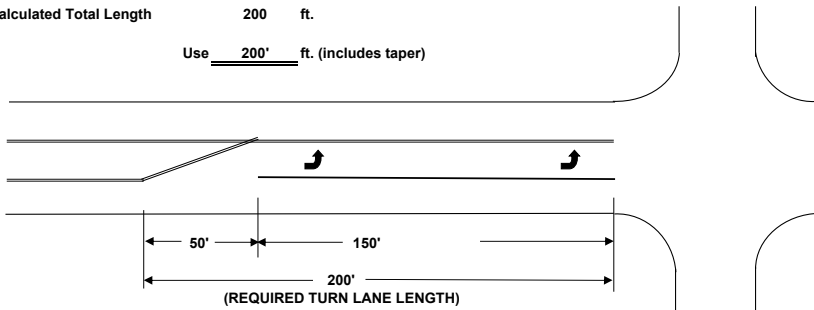
Calculated Turn Lane Length	125	125	125
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Turning Length/lane	125	125	125
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<b>Backup Check</b>			
Vehicles/cycle	2	1	3
Backup Length	100	50	150
Backup Length/lane	100	50	150

Calculated Total Length      200      ft.

Use 200' ft. (includes taper)



**CHARTS**

AM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 23.80952 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

MID						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 33.33333 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

PM						
S= 175						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	100	100	175	175	175	175
USC	100	100	100	100	100	100
UTR	100	100	175	175	175	175

- A
- 1                      50
- 2                      100
- 3                      150
- 4                      175
- 5                      200
- 6                      250

**TURN LANE LENGTH CALCULATION**  
BEL-70-9.35

LOVES TRUCK ACCESS & SR 149  
2047 BUILD

Turn

EBR

Calc. By: DLW

AM MID PM

Check By: J Hamilton

Design Speed 45 mph

Date: 6/26/2024

Type of traffic Control: S

SIGNALIZED  
 UNSIGNALIZED  STOPPED  CROSSROAD  
 UNSIGNALIZED  THROUGH ROAD

Turning Volume 80 70 50 vehicles

No. of turn lanes | 1

Through Volume 10 10 10 vehicles

No. of through lanes | 1

Cycle length 90 110 120 secs.

Cycle per hour 40 33 30

Vehicles/cycle 2 3 2

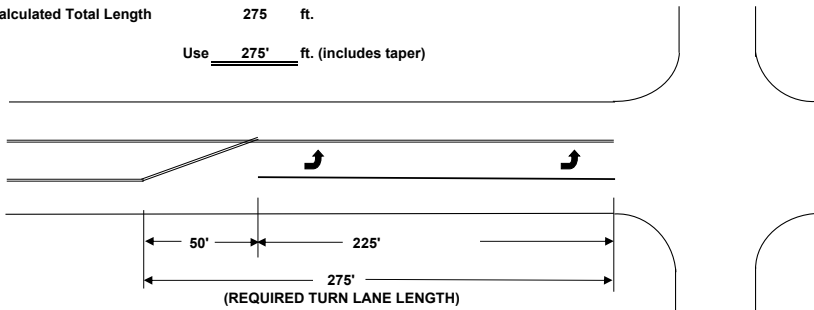
Calculated Turn Lane Length 175 225 225

Turning Length/lane 175 225 225

**Backup Check**  
Vehicles/cycle 1 1 1  
Backup Length 50 50 50  
Backup Length/lane 50 50 50

Calculated Total Length 275 ft.

Use 275' ft. (includes taper)



**CHARTS**

AM						
S= 225						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 AM						
% OF TRAFFIC TURNING A.M. 88.88889 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 AM		40-45 AM		50-60 AM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	225	225	225	225
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

MID						
S= 275						
USC= FALSE						
UTR= FALSE						
SPEED = 40-45 PM						
% OF TRAFFIC TURNING P.M. 87.5 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	200	200	275	275	275	275
USC	200	200	200	200	200	200
UTR	200	200	275	175	275	175

PM						
S= 275						
USC= FALSE						
UTR= FALSE						
SPEED = 30-35 PM						
% OF TRAFFIC TURNING P.M. 100 HIGH						
Type of Traffic Control	DESIGN SPEED (mph)					
	30-35 PM		40-45 PM		50-60 PM	
	TURNING DEMAND VOLUME					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
S	150	150	261	261	261	175
USC	150	150	150	150	150	150
UTR	150	150	225	175	225	175

- A
- 1 50
- 2 100
- 3 150
- 4 175
- 5 200
- 6 250