



# Technical Memo

I-25 Lane Configuration  
County Line Road to Lincoln Avenue

*February 2005*

Submitted To:   
**CDOT Region 6**  
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## **I-25 Lane Configuration County Line Road to Lincoln Avenue**

### **INTRODUCTION**

The purpose of this technical memorandum is to document design decisions and a recommendation for modifications to the existing I-25 lane configuration from County Line to Lincoln (Existing I-25 Lane Configuration) to assist with the overall design and operations of either the general purpose lane or the express lane alternative developed for the C-470 Environmental Assessment (EA).

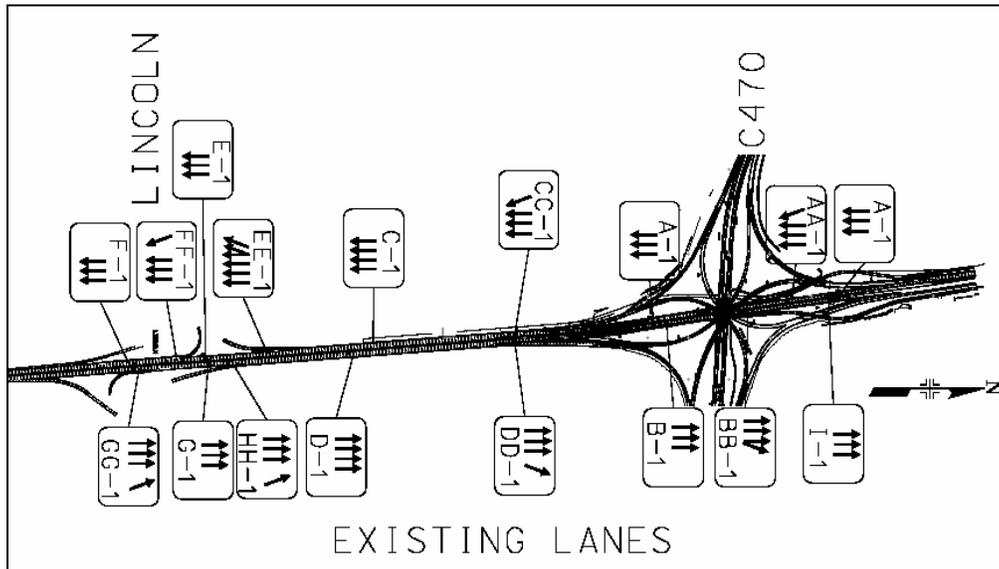
A proposed future I-25 configuration from County Line to Lincoln (Original I-25 Design) received from CDOT was used to design the connections of the Recommended C470/I-25 Express Lane Interchange. After merging these designs together, it was determined that modifications to the Existing I-25 Lane Configuration or the Original I-25 Design was needed to facilitate the overall operations of I-25 between County Line and Lincoln for the express lane alternative. Traffic projections and modeling done by PBS&J/Wilson for the general purpose lane alternative also showed the need for these modifications.

The following information summarizes the Existing I-25 Lane Configuration, the Original I-25 Design, and the Recommended Modifications to the Original I-25 Design (Recommended Modifications).

### **EXISTING I-25 LANE CONFIGURATION**

The existing I-25 lane configuration from the County Line Road ramps south to the Lincoln Avenue interchange consists of three through lanes with auxiliary lanes between the C470 interchange and the Lincoln Avenue interchange. The C470 entrance (southbound) and exit (northbound) ramps and the Lincoln on-ramps are all one lane ramps. The southbound Lincoln Avenue exit ramp is a two-lane ramp. The existing condition is illustrated below and summarized in the corresponding table:

**Figure 1**  
**Existing I-25 Lane Configuration**



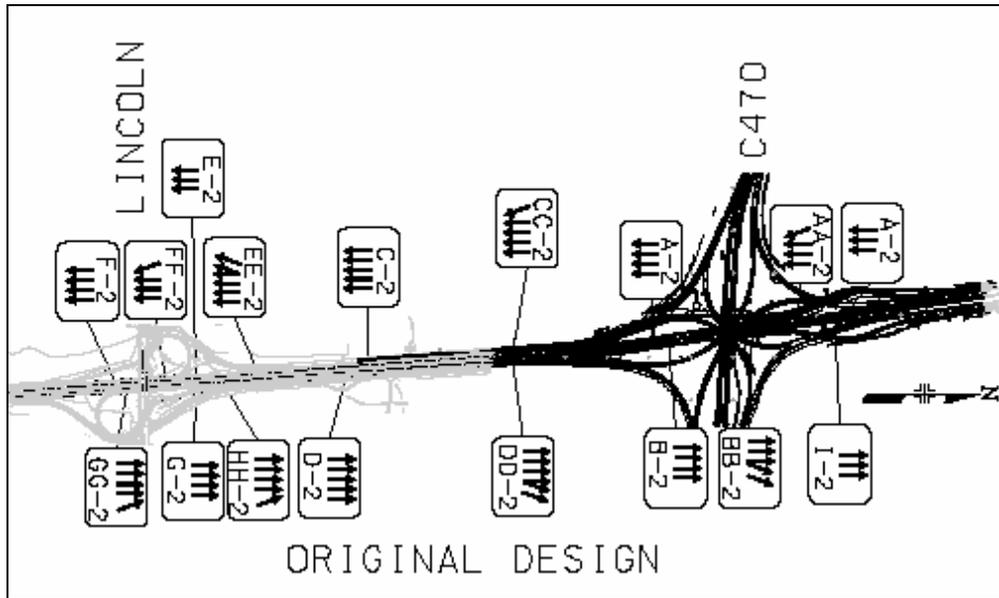
**Table 1**  
**Existing I-25 Lane Configuration**

ID No.	Segment	Existing Number Lanes
A	I-25 SB - County Line to 470 SB Ramp	☆4-3
C	I-25 SB - 470 SB Ramp to Lincoln Ave Off Ramp	4
E	I-25 SB - Lincoln Ave Off Ramp to Lincoln Ave Loop	3
F	I-25 SB - Lincoln Ave Loop to EB Lincoln Ave On-Ramp	☆4-3
I	I-25 NB - North of County Line Off Ramp	3
B	I-25 NB - 470 Off Ramp to County Line Off Ramp	3
D	I-25 NB - Lincoln Avenue WB On Ramp to 470 Off Ramp	4
G	I-25 NB - Lincoln Avenue EB Loop On Ramp to Lincoln Ave WB On Ramp	☆4-3
<b>Ramps</b>		
AA	County Line to SB I-25	1
BB	NB I-25 to County Line	1
CC	C470/E470 to SB I-25	2 <sup>▲</sup>
DD	NB I-25 to C470/E470	1
EE	SB I-25 to Lincoln Avenue	2
FF	WB Lincoln Avenue to SB I-25 Loop	1
GG	EB Lincoln Avenue to NB I-25 Loop	1
HH	WB Lincoln Avenue to NB I-25	2 <sup>▲</sup>
☆ Ramp Lane Drops ▲ Two Lane Ramp Drops to One Lane at I-25 Gore		

**ORIGINAL DESIGN**

The Original I-25 Design consists of four through lanes on I-25 from County Line Road south to Lincoln Avenue. The design includes the future expansion of I-25 to four through lanes in each direction south of Lincoln Avenue. The Original I-25 Design is illustrated below and summarized in the corresponding table:

**Figure 2**  
**Original I-25 Design**



**Table 2**  
**Original I-25 Design Lane Configuration**

ID No.	Segment	Original Design Number Lanes
A	I-25 SB - County Line to 470 SB Ramp	4
C	I-25 SB - 470 SB Ramp to Lincoln Ave Off Ramp	5
E	I-25 SB - Lincoln Ave Off Ramp to Lincoln Ave Loop	3
F	I-25 SB - Lincoln Ave Loop to EB Lincoln Ave On-Ramp	4
I	I-25 NB - North of County Line Off Ramp	3
B	I-25 NB - 470 Off Ramp to County Line Off Ramp	4
D	I-25 NB - Lincoln Avenue WB On Ramp to 470 Off Ramp	5
G	I-25 NB - Lincoln Avenue EB Loop On Ramp to Lincoln Ave WB On Ramp	4
<b>Ramps</b>		
AA	County Line to SB I-25	1
BB	NB I-25 to County Line	2
CC	C470/E470 to SB I-25	2 <sup>△</sup>
DD	NB I-25 to C470/E470	2
EE	SB I-25 to Lincoln Avenue	2
FF	WB Lincoln Avenue to SB I-25 Loop	1
GG	EB Lincoln Avenue to NB I-25 Loop	1
HH	WB Lincoln Avenue to NB I-25	2 <sup>△</sup>
☆ Ramp Lane Drops △ Two Lane Ramp Drops to One Lane at I-25 Gore		

**RECOMMENDED MODIFICATIONS**

After merging the Express Lane Interchange design with the Original I-25 Design, we identified areas where modification to the Existing I-25 Lane Configuration or the Original I-25 Design could potentially enhance the overall operations of these closely

spaced interchanges and would help address lane balance issues. A summary of these suggested modifications are as follows:

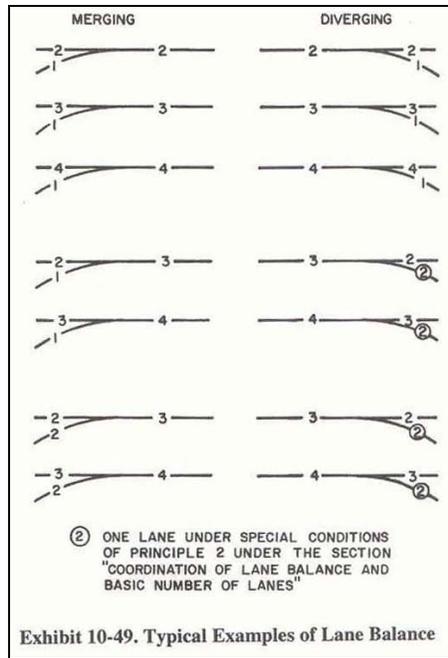
**Southbound I-25**

- The fourth through lane for southbound I-25 was added at the C470 ramp gore instead of at the County Line Road ramp. The volumes on the C470/E470 ramps are significantly higher than the County Line Road Ramp. This also would allow the development of a two-lane on-ramp (one lane for EB C470 ramp and one lane for WB E470 ramp) for the 470 connection to southbound I-25. The County Line Road ramp would remain a ramp entrance drop as it is today.
- This fourth through lane for southbound I-25 would be carried through the Lincoln Avenue interchange instead of dropping it between the Lincoln Avenue off-ramp and the westbound Lincoln Avenue loop ramp. This allows a freeway lane (traffic from C470/E470) to become the freeway through lane and eliminates a through lane drop. We were able to do this by maintaining the same configuration of the existing westbound Lincoln Avenue loop ramp. This existing condition is an acceleration lane tapered into the through lanes.

**Northbound I-25**

- The modified design for northbound I-25 recommends that the gore of northbound I-25 and the C470/E470 ramp be moved further to the south to allow additional distance from this gore to the gore of the C470/E470 ramps. The critical issue of this configuration is that this two-lane ramp splits into one lane for each of these 470 ramps. The existing infrastructure does not allow an additional lane to be continued on either of these ramps. Additional distance between these gores would facilitate the signage of the C470/E470 ramps and the weaves required to move into the correct lane. The following exhibits illustrate AASHTO's recommended lane balance and distance between gores.

**Figure 3**  
**Typical Examples of Lane Balance**



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**Figure 4**  
**Recommended Minimum Ramp Terminal Spacing**

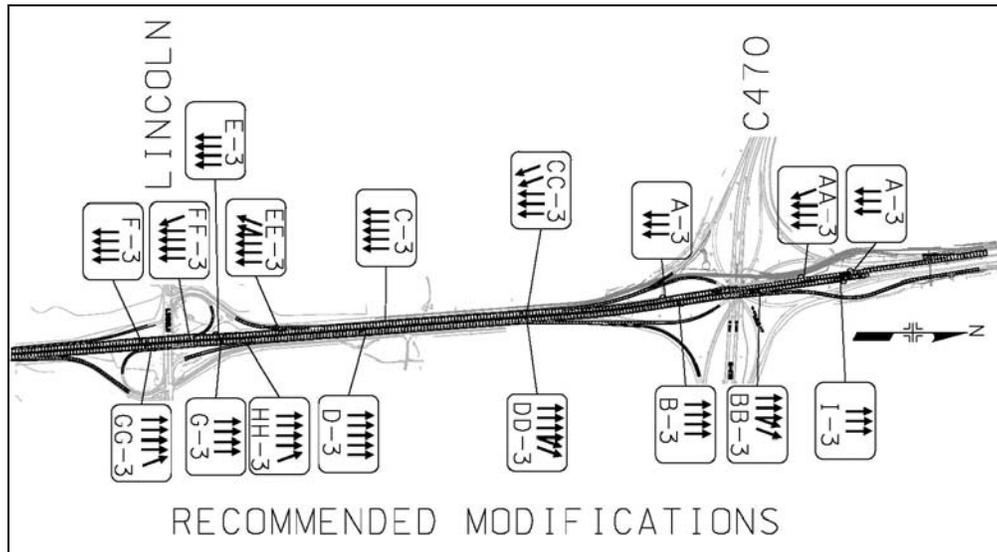
EN-EN OR EX-EX		EX-EN		TURNING ROADWAYS		EN-EX (WEAVING)			
FULL FREEWAY		FULL FREEWAY		SYSTEM INTER-CHANGE		SYSTEM TO SERVICE INTERCHANGE		SERVICE TO SERVICE INTERCHANGE	
CDR OR FDR		CDR OR FDR		SERVICE INTER-CHANGE		FULL FWY.		CDR OR FDR	
MINIMUM LENGTHS MEASURED BETWEEN SUCCESSIVE RAMP TERMINALS									
300 m (1000 ft)	240 m (800 ft)	150 m (500 ft)	120 m (400 ft)	240 m (800 ft)	180 m (600 ft)	600 m (2000 ft)	480 m (1600 ft)	480 m (1600 ft)	300 m (1000 ft)
<p>NOTES: FDR - FREEWAY DISTRIBUTOR ROAD EN - ENTRANCE CDR - COLLECTOR DISTRIBUTOR ROAD EX - EXIT</p> <p>THE RECOMMENDATIONS ARE BASED ON OPERATIONAL EXPERIENCE AND NEED FOR FLEXIBILITY AND ADEQUATE SIGNING. THEY SHOULD BE CHECKED IN ACCORDANCE WITH THE PROCEDURE OUTLINED IN THE HIGHWAY CAPACITY MANUAL (4) AND THE LARGER OF THE VALUES IS SUGGESTED FOR USE. ALSO, A PROCEDURE FOR MEASURING THE LENGTH OF THE WEAVING SECTION IS GIVEN IN CHAPTER 24 OF THE 2000 HIGHWAY CAPACITY MANUAL (4). THE "L" DISTANCES NOTED IN THE FIGURES ABOVE ARE BETWEEN LIKE POINTS, NOT NECESSARILY "PHYSICAL" GORES. A MINIMUM DISTANCE OF 90 m (270 ft) IS RECOMMENDED BETWEEN THE END OF THE TAPER FOR THE FIRST ON RAMP AND THE THEORETICAL GORE FOR THE SUCCEEDING ON RAMP FOR THE EN-EN (SIMILAR FOR EX-EN).</p>									

Exhibit 10-68. Recommended Minimum Ramp Terminal Spacing

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The Recommended Modifications include the future expansion of I-25 to four through lanes in each direction south of Lincoln Avenue. The Recommended Modifications are illustrated below and summarized in corresponding table:

**Figure 5  
 Recommended Modifications**



**Table 3  
 Summary of the Recommended Modifications Lane Configuration**

ID No.	Segment	Proposed Design Number Lanes
A	I-25 SB - County Line to 470 SB Ramp	☆4-3
C	I-25 SB - 470 SB Ramp to Lincoln Ave Off Ramp	5
E	I-25 SB - Lincoln Ave Off Ramp to Lincoln Ave Loop	4
F	I-25 SB - Lincoln Ave Loop to EB Lincoln Ave On-Ramp	☆5-4
I	I-25 NB - North of County Line Off Ramp	3
B	I-25 NB - 470 Off Ramp to County Line Off Ramp	4
D	I-25 NB - Lincoln Avenue WB On Ramp to 470 Off Ramp	5
G	I-25 NB - Lincoln Avenue EB Loop On Ramp to Lincoln Ave WB On Ramp	☆5-4
<b>Ramps</b>		
AA	County Line to SB I-25	1
BB	NB I-25 to County Line	2
CC	C470/E470 to SB I-25	2
DD	NB I-25 to C470/E470	2
EE	SB I-25 to Lincoln Avenue	2
FF	WB Lincoln Avenue to SB I-25 Loop	1
GG	EB Lincoln Avenue to NB I-25 Loop	1
HH	WB Lincoln Avenue to NB I-25	1
☆ Ramp Lane Drops ▲ Two Lane Ramp Drops to One Lane at I-25 Gore		

## County Line Road to Lincoln Avenue

**COMPARISON OF EXISTING I-25 LANE CONFIGURATION, ORIGINAL I-25 DESIGN, AND THE RECOMMENDED MODIFICATIONS**

The following table summarizes the differences in the number of lanes between the Existing I-25 Lane Configuration, Original I-25 Design, and the Recommended Modifications:

**Table 4  
Comparison of Lane Configurations**

ID No.	Segment	(1)	(2)	(3)	(3)-(2)	(3)-(1)
		Existing Number Lanes	Original Design Number Lanes	Proposed Design Number Lanes	Difference Original vs. Proposed	Difference Proposed vs. Existing
A	I-25 SB - County Line to 470 SB Ramp	☆4-3	4	☆4-3	-1	0
C	I-25 SB - 470 SB Ramp to Lincoln Ave Off Ramp	4	5	5	0	+1
E	I-25 SB - Lincoln Ave Off Ramp to Lincoln Ave Loop	3	3	4	+1	+1
F	I-25 SB - Lincoln Ave Loop to EB Lincoln Ave On-Ramp	☆4-3	4	☆5-4	+1	+1
I	I-25 NB - North of County Line Off Ramp	3	3	3	0	0
B	I-25 NB - 470 Off Ramp to County Line Off Ramp	3	4	4	0	+1
D	I-25 NB - Lincoln Avenue WB On Ramp to 470 Off Ramp	4	5	5	0	+1
G	I-25 NB - Lincoln Ave WB On Ramp to Lincoln Avenue EB Loop On Ramp	☆4-3	4	☆5-4	0	+1
<b>Ramps</b>						
AA	County Line to SB I-25	1	1	1	0	0
BB	NB I-25 to County Line	1	2	2	0	+1
CC	C470/E470 to SB I-25	2 <sup>△</sup>	2 <sup>△</sup>	2	+1	+1
DD	NB I-25 to C470/E470	1	2	2	0	+1
EE	SB I-25 to Lincoln Avenue	2	2	2	0	0
FF	WB Lincoln Avenue to SB I-25 Loop	1	1	1	0	0
GG	EB Lincoln Avenue to NB I-25 Loop	1	1	1	0	0
HH	WB Lincoln Avenue to NB I-25	2 <sup>△</sup>	2 <sup>△</sup>	1	0	0
☆ Ramp Lane Drops △ Two Lane Ramp Drops to One Lane at I-25 Gore						