

Date: July 9, 2025**To:** City of Fair Oaks Ranch**From:** Oscar Michael Garza, PE, PTP, PTOE, RSP₁
Jeanne Tarrants, RSP₂**Project:** Front Gate Left Turn Lane Analysis

INTRODUCTION

Legacy Engineering Group was tasked with preparing this Technical Memorandum which provides a left-turn lane analysis for the intersection of Front Gate and Fair Oaks Ranch Parkway within the City of Fair Oaks Ranch. The purpose is to assess whether an eastbound dedicated left-turn lane is warranted based on operational and safety conditions using volume thresholds referenced from the City of San Antonio's Unified Development Code and the National Cooperative Highway Research Program (NCHRP) Report 745 that offers nationally recognized thresholds for left-turn accommodations at unsignalized intersections.

EXISTING CONDITIONS

- **Jurisdiction:** City of Fair Oaks Ranch
- **Roadway Classification:** Collector
- **Posted Speed Limit:** 35 mph
- **Intersection Control:** Unsignalized
- **Existing Configuration:** Two-lane divided roadway with no dedicated left-turn lane



Figure 1 – Front Gate & Fair Oaks Ranch Parkway facing East

OPERATIONAL ANALYSIS

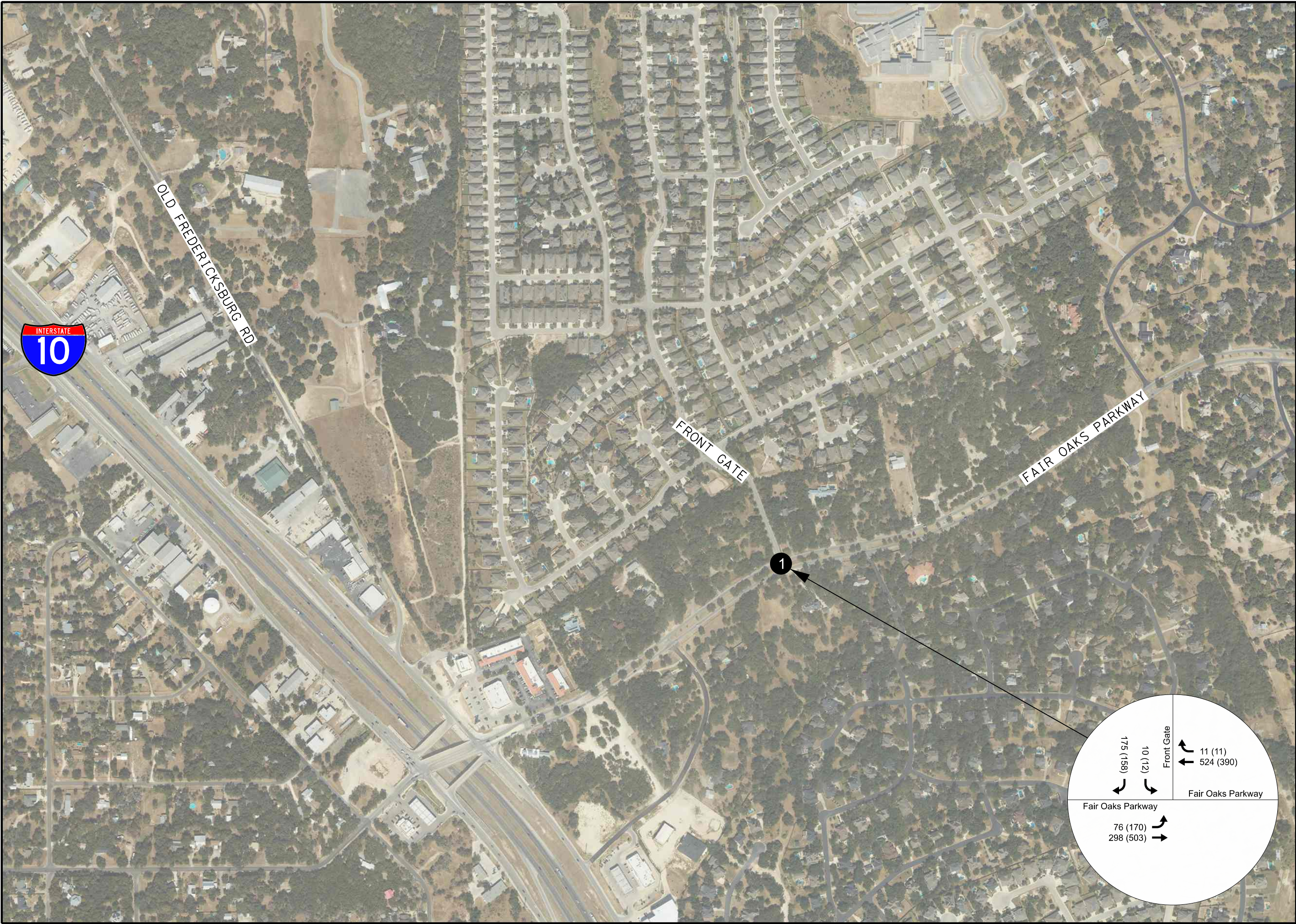
Turning movement counts (TMCs) were collected on **Friday May 16, 2025**, during weekday peak periods. The peak periods were determined to be 7:30 – 8:30 AM and 4:30-5:30 PM.


The City of Fair Oaks Ranch Unified Development Code (UDC) references the City of San Antonio's UDC for traffic engineering standards. Accordingly, peak left-turn volumes for each approach were evaluated using the criteria established in San Antonio's UDC. Per Section 35-502, a dedicated left-turn lane is warranted when left-turn volumes reach or exceed fifty (50) vehicles during the peak hour. In addition, guidance from NCHRP Report 745 provides recommended thresholds for left-turn lane warrants on urban and suburban arterials as summarized in Table 1.

Table 1 - Recommended left-turn lane warrants for urban and suburban arterials (NCHRP 745)

Left-Turn Lane Peak-Hour Volume (veh/hr)	Three-Leg Intersection, Major Urban and Suburban Arterial Volume (veh/hr/ln) That Warrants a Left-Turn Lane	Four-Leg Intersection, Major Urban and Suburban Arterial Volume (veh/hr/ln) That Warrants a Left-Turn Lane
5	450	50
10	300	50
15	250	50
20	200	50
25	200	50
30	150	50
35	150	50
40	150	50
45	150	< 50
50 or More	100	< 50

The exhibit on the following page presents the peak hour turning movements at the intersection of Fair Oaks Parkway and Front Gate. During the AM peak hour, left-turn volume is 76, with a total major road volume of 909 vehicles per hour. In the PM peak hour, the left-turn volume increases to 170 vehicles, with a corresponding major road volume of 1,074 vehicles per hour. Both peak periods exceed the City of San Antonio's threshold of 50 left-turning vehicles per hour, as well as the volume criteria recommended in NCHRP Report 745. These findings support the need for a dedicated left-turn lane at this location.





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Front Gate Subdivision

Along Fair Oaks Parkway East of Interstate I-10

Traffic Movement Counts (5-16-2025)

Legend

AM / (PM)

 Intersection No.

DATE:
6/23/2025

SCALE:
1" = 200'

PAGE:
3

CRASH DATA SUMMARY

Crash data from January 2015 through May 2025 was obtained via TxDOT's CRIS Query application. Analysis of the data revealed a total of twenty-three (23) crashes near the intersection of Fair Oaks Parkway and Front Gate. Of these, seven (7) crashes may have been preventable with the addition of an eastbound left-turn lane on Fair Oaks Parkway at Front Gate.

ALTERNATIVE ANALYSIS

To evaluate the operational and safety benefits of implementing a left turn lane (LTL) at the subject intersection, several design alternatives were considered. These alternatives were assessed based on key criteria including cost, safety, alignment with design standards, level of service (LOS), and downstream impacts to develop an overall ranking.

The hybrid left turn lane emerged as the top-ranked alternative. This alternative, which combines some elements of the traditional left turn lane with geometric compromises, must be shortened to avoid structural impacts to a nearby culvert. This option offers a balanced solution with moderate costs and significant safety improvements. While it does not fully meet optimal design criteria, its benefits in safety and cost make it the most favorable option.

The full left turn lane, which follows recommended design criteria, also scored highly, particularly in safety and LOS, but its higher cost and greater design complexity placed it second in the ranking.

Other alternatives such as restriping and an all-way stop were more cost effective but lacked safety and design benefits necessary to justify their implementation. Options like the hooded left and full closure were found to have negative safety and operational impacts, despite being lower in cost.

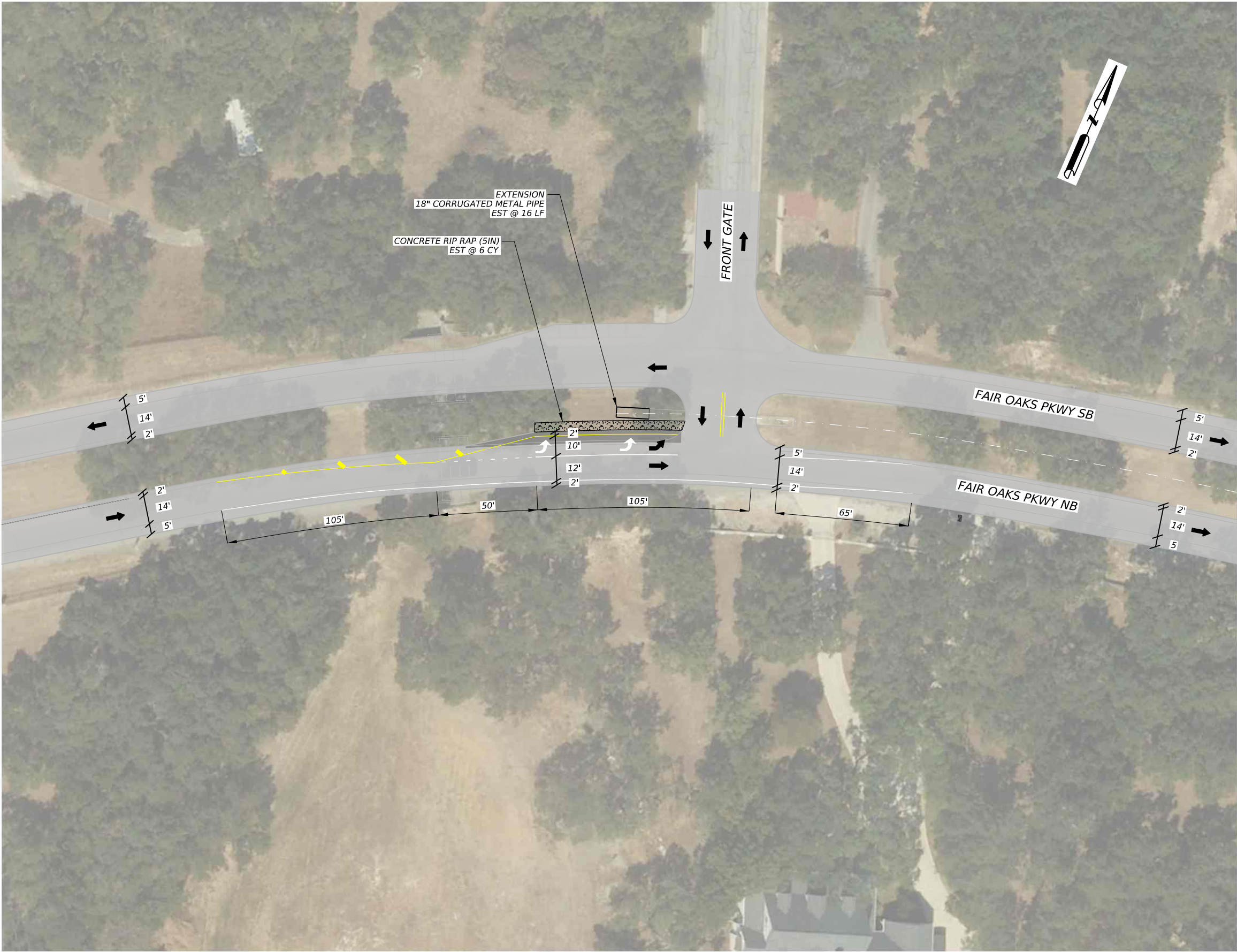
Table 2 shows the alternative comparison matrix and rankings.

Table 2 - Left Turn Alternative Comparison Matrix

Alternatives	Cost	Safety	Optimal Design Criteria	LOS	Downstream Impacts	Alternative Ranking
All-Way Stop	\$	-	-	-	Yes	4
Restripe	\$	+	-	+	No	3
Hybrid LTL	\$\$	++	✓✓	+++	No	1
Full LTL	\$\$\$	+++	✓✓✓	+++	No	2
Hooded Left In	\$\$\$	--	-	--	Yes	5
Hooded Left Out	\$\$\$	--	-	--	Yes	5
Full Closure	\$	+	✓	+	Yes	4

The following pages include two exhibits illustrating the hybrid left-turn lane design—one showing the geometric layout alone, and the other incorporating AutoTURN-generated vehicle paths to demonstrate truck maneuverability.

Exhibit B

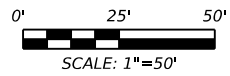


LEGEND

← TRAFFIC FLOW

EXISTING ROADWAY

PROPOSED ROADWAY



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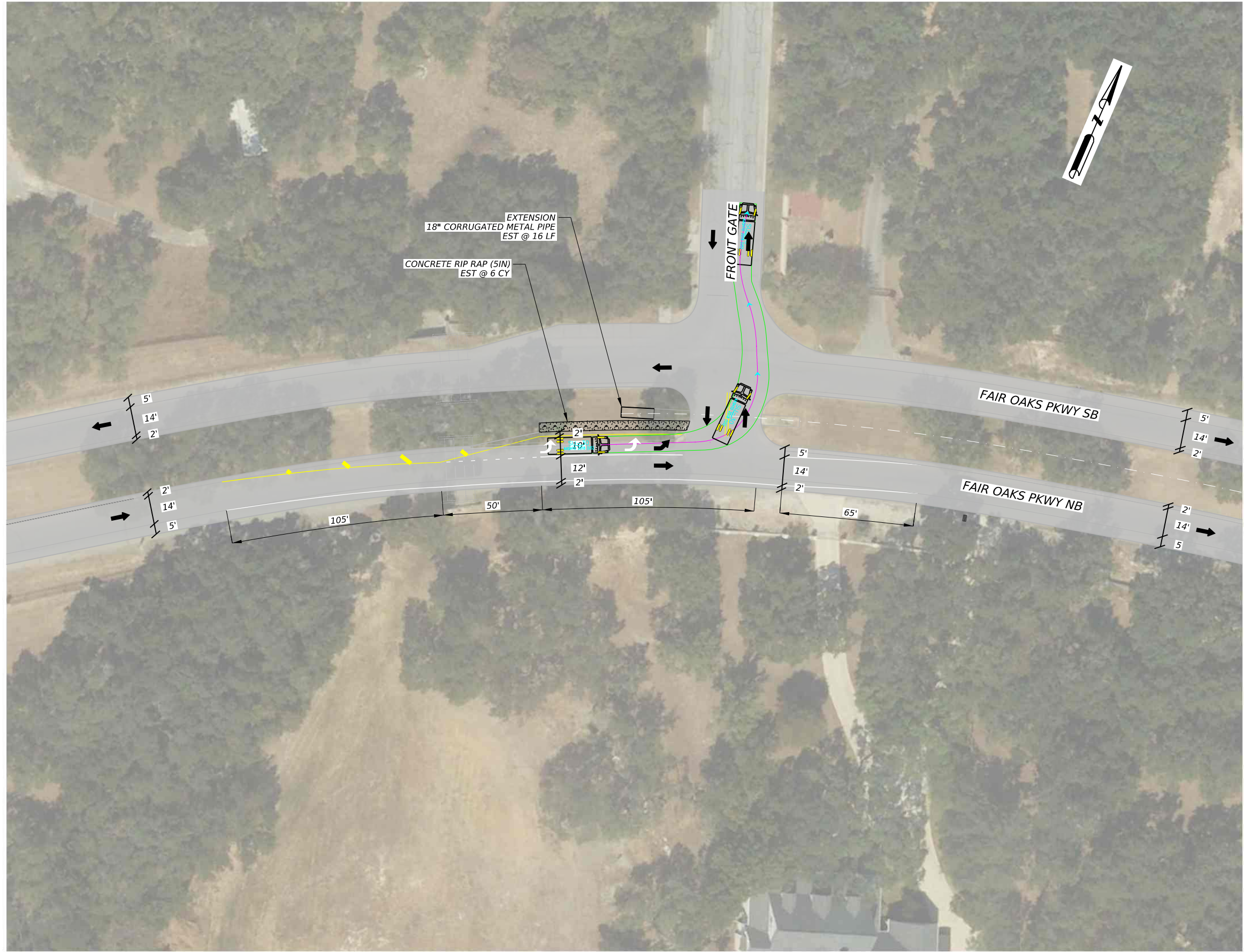
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**FAIR OAKS PKWY AT FRONT GATE
EXHIBIT**

SCALE: 1" = 50'

FED. RD. DIV. NO.		PROJECT NO.		SHEET
6		-		
STATE	DIST.	COUNTY		
TEXAS	SAT			
CONT.	SECT.	JOB	HIGHWAY NO.	

Exhibit B



LEGEND



TRAFFIC FLOW

EXISTING ROADWAY

PROPOSED ROADWAY



SCALE: 1"=50'



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*FAIR OAKS PKWY AT FRONT GATE
EXHIBIT*

SCALE: 1" = 50'

FED. RD. DIV. NO.	PROJECT NO.			SHEET
6	-			
STATE	DIST.	COUNTY		
TEXAS	SAT			
CONT.	SECT.	JOB	HIGHWAY NO.	

CONCLUSION

The purpose of this report is to assess whether an eastbound dedicated left-turn lane is warranted at the intersection of Fair Oaks Parkway and Front Gate, in the City of Fair Oaks Ranch, based on operational and safety conditions using volume thresholds.

The City of Fair Oaks Ranch Unified Development Code (UDC) adopts traffic engineering standards from the City of San Antonio's UDC. As such, left-turn volumes at the intersection of Fair Oaks Parkway and Front Gate were evaluated using San Antonio's criteria, which establish a warrant for a dedicated left turn lane when peak-hour volumes reach or exceed 50 vehicles. Additionally, guidance from NCHRP Report 745 was considered, offering nationally recognized thresholds for left-turn lane warrants on urban and suburban arterials.

During the AM peak hour, left-turn volume is 76, with a total major road volume of 1,002 vehicles per hour. In the PM peak hour, the left-turn volume increases to 170 vehicles, with a corresponding major road volume of 1,075 vehicles per hour. Both peak periods exceed the City of San Antonio's threshold of 50 left-turning vehicles per hour, as well as the volume criteria recommended in NCHRP Report 745. These findings support the need for a dedicated left-turn lane at this location.

A review of crash data from January 2015 through May 2025 found that seven of twenty-three crashes near the intersection of Fair Oaks Parkway and Front Gate may have been preventable with the addition of an eastbound left-turn lane on Fair Oaks Parkway at Front Gate.

To evaluate the operational and safety benefits of implementing a left turn lane (LTL) at the subject intersection, several design alternatives were considered. These alternatives were assessed based on key criteria including cost, safety, alignment with design standards, level of service (LOS), and downstream impacts to develop an overall ranking. Of the seven alternatives, the hybrid left turn lane emerged as the top-ranked alternative.

Based on the operational analysis, crash history, and evaluation of design alternatives, the findings support the implementation of a dedicated eastbound left-turn lane at the intersection of Fair Oaks Parkway and Front Gate. The hybrid left turn lane, while requiring geometric adjustments due to nearby constraints, offers the most balanced solution in terms of safety, cost, and operational performance.



7/9/2025

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